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VERITATEM PER MEDICINAM QUÆRAMUS

Illustrated and Descriptive
CATALOGUE

THIRD EDITION

—OF—

ROENTGEN X-RAY APPARATUS

AND

ACCESSORIES

Apparatus for the Generation and Application
of High Frequency Currents. Apparatus
for the Therapeutic Application
of Light Energy.



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INTRODUCTORY REMARKS.

The news of *Roentgen's* discovery came to the world from *Vienna* in December, 1895. On the twenty-third of January, 1896, *Wilhelm Konrad Roentgen*, at that time professor of physics at *Würzburg*, demonstrated his discovery for the first time at a meeting of the *Physico-Medical Society* of that city.

We can already speak of the history of this subject. Much, that is of a positive nature, has already been accomplished within this brief period, but the discovery has also given rise to many controversies, and to many erroneous views.

It is not just that the favorable aspects alone of such a discovery be discussed, the errors which are connected with it must also be met and disposed of.

In *Roentgen's* own communications concerning his discovery we can find almost all the information and observations relating to the physics of the subject which we possess from all other sources up to the present time.

The peculiarities of the X-Rays, especially their diffuse reflecting properties, which have furnished such a field for work to those who have had to deal with the mechanical side of the subject are referred to in *Roentgen's* communications. He has explained in a brief manner and yet almost exhaustively the facts relating to their existence and their effects.

Only in one particular has pure physics suggested anything really new since the original discovery was made: *In the Investigation of the nature of X-Rays and their application we have made a great advance since that time.*

We propose to sketch the historical development of the technical side of the subject, which to-day furnishes occupation for hundreds of workmen throughout the world besides a large number of electrical engineers.

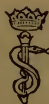
Roentgen himself used for his investigations a *Ruhmkorff* induction coil with an interrupter and a tube of high vacuum, such as were then used for investigations on the cathode rays. These constitute the essential elements of the subsequent *Röntgen armamentarium*:
INDUCTION COIL—INTERRUPTER—VACUUM TUBE.

Next in order the attempts were made in every direction to repeat the experiments of *Roentgen*. The electro-mechanic and the glass blower could not produce induction apparatus and vacuum tubes fast enough to satisfy the suddenly created demand. Everything which served for the generation of electricity of high tension, including large and small varieties of induction apparatus, *Holtz's*, *Töpler's*, and *Wimshurst's* machines were brought into requisition, and some went so far as to construct a spark apparatus for themselves with the outlay of infinite labor and pains.

The varieties of vacuum tubes which were devised can be numbered by the hundreds, and most of them produced only sorry results. Thousands and thousands of dollars were spent for no practical utility in the hurry and urgency connected with this important and far-reaching event.

How great was the happiness, after repeated disappointments with the feeble illumination from the Barium-Platino Cyanide Screen, if one happened to discover that X-Rays were really present.

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With the majority of experimenters the first *Roentgen* pictures displayed concealed metallic objects and the outline of the human hand. They were all equally faulty, indistinct and deficient in clearness of contour.

The X-Rays, in these earlier experiences, emanated from different points, mainly from the glass walls of the tube upon which the cathode rays were impinging. Under such conditions the extensive use of X-Rays by physicians for therapeutic purposes was out of the question.

Then *Roentgen* himself or his associate *Zehnder* supplemented his first discoveries by an additional communication. In paragraph 20 of this communication published in the proceedings of the *Physico-Medical Society* of *Würzburg* he announced that he was then using a discharging apparatus (X-Ray tube) in which a concave aluminum mirror served as a cathode and a platinum disc as an anode.

If it had not been possible by such means to produce a central projection the general use of X-Rays for the inspection of the thorax and pelvis might have been impossible. From this moment, with the discovery of the so-called focus tube, the *Roentgen* system may be said to have begun.

In order to understand the first as well as the subsequent stages of the evolution of this question we must understand with clearness the conditions under which this system can be of service.

The *Roentgen technique* is a technique which belongs to the domain of physics, and must refer back to that foundation at every step in its progress. Consequently it differs materially from the electro-technique which stands independently and powerfully upon the broad basis of abundant experience and knowledge.

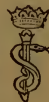
The establishments in which machines for the production of electric light and electric power are constructed are therefore not the places in which one would expect to construct *Roentgen* apparatus. In the manufacture of electrical appliances in general the electrical engineer constructs machinery for his fellow engineers. The machine which is planned by one, as constructor, and is then built up in the workshop, is passed upon and tested by the other who usually receives it with more or less knowledge as to its value which is based upon more or less antecedent experience, upon opinions which have been acquired by such experience, and upon laws which have been similarly acquired.

But in the construction of the *Roentgen* apparatus the market was of a different character, for it was obliged to deal with the manufacturers of instruments for physicians. These were novices who had ordered the building of *Roentgen* apparatus, novices who were not in position to pass critical judgment upon the machines which they had ordered. Still less were they in a position to do this because at first there was no common standard for opinions, no experience, and no practical work which had been done upon this subject. Even to this day there is comparatively little of this experience in existence. It was, therefore, impossible at first to decide as to what was good and what was bad. One man praised the identical thing that was blamed by the next man, and controversies arose about things which now seem too clear to give rise to such uncertainty. These two conditions prevailed at the same time.

The enormously expanded electrical technique, the art of this electrical engineer, did not trouble itself about the construction of this electrical apparatus. Hence the construction of the *Roentgen* apparatus slipped out of the hands of the electrical engineer, and was transferred to the workshops of surgical instrument makers and mechanics.

Erroneous and futile efforts in abundance were the inevitable consequence. As is usually the case those who were imperfectly equipped as to the fundamental principles which obtained in this matter, and who were lacking in judgment, made themselves conspicuous at this time. The result was that hundreds and thousands of dollars were taken from physicians under such

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conditions, and nothing of any practical value was given in return. It was at this time that errors arose which were absurd, and yet could not be easily controverted, as for example that the efficiency of a *Roentgen* apparatus must be estimated simply by the length of the spark. It was at this time that designs for interrupters by the hundreds sprang like fungi from the ground, and differed in appearance only in the slightest degree. These were thrown upon the market with great flourish of trumpets, and were sold one after another with no practical benefit as a result. This was the time which brought discredit upon the entire *Roentgen* procedure and great depreciation of its real value. Notwithstanding all these disadvantages and mishaps the system still survives.

What physician is there who went through this period, and patiently endeavored to work out all the problems, to solve all the errors which came in his way until he had finally acquired a volume of information, a critical opinion, a conclusion upon this subject which he could call his own, what physician is there, we say, who will admit at the present time that there is any particular difficulty in the *Roentgen* system of treatment? What physician, who is a specialist in this line, who will not concede that the general practitioner, the novice, can now in a very short time reach the same high plane of knowledge in this department which he was able to reach only after the greatest effort?

After the discovery of the so-called focus tubes, marked progress was made by numerous manufacturers in the production of *Roentgen* tubes. *Rosenthal* was one of the first who perfected the tubes on the basis of theoretical calculations. He made his cathodes barely perceptible externally, made the tubes as large as possible, and in that way improved the conditions for the generation of the cathodal rays and for the life of the tube as well.

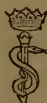
In 1897 came the methods for regulating the vacuum of the discharge apparatus (X-Ray tube) which were first put in practice in France. Small quantities of caustic potash, caustic soda and other substances were placed in an accessory glass chamber fused upon the X-Ray tube proper, and as the chemicals were heated they gave off gas which lowered the vacuum in the tube. These methods reached perfection after the *Villard* invention of fusing palladium metal into an accessory chamber, and by the methods of regeneration devised by *Sayen of Philadelphia* and *Müller of Hamburg*.

The invention of the motor-interrupter did not signify a real advance. It signified rather a complication, and complications in an instrument which is placed in the hands of those who are uninformed on such matters are only permissible when they introduce great compensatory advantages. But the advantages which were to be derived from the motor-interrupter were not great. It is true that the interruptions were somewhat more regular, and could be controlled somewhat more readily than under the conditions which previously existed, but this was only a slight advantage, for actual regularity was not attained, and the upward increase in frequency quickly reached its limit as was shown by the oscillations of the column of mercury.

Following a suggestion of *Edison* in 1897 a screen of tungstate of calcium was manufactured, which when placed upon a suitable plate materially increased the influence of the X-Rays by its own blue fluorescence, and in that way shortened the time which was necessary for exposure to them.

The first attempts at the diminishing of the diffuse reflection of the X-Rays, made, it is true, without investigation into the actual relations which existed, appear to have originated in France. According to *Dollinger's* account *Buguet*, *Radiguet* and *Guichard* were the first to use metallic surfaces and metallic boxes in the examinations with *Roentgen* rays. This was in 1897-8, and may be regarded as the beginning of the existing comprehensive system of examinations by means of *diaphragms*.

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The situation of the *Roentgen* ray art during those particular years can be conveniently followed by means of the exhibits which appeared at the annual meetings of physicians, which included exhibits of the various forms of *Roentgen* ray apparatus made by different manufacturers. It was quite observable at these exhibitions that progress was being made from year to year, but a hundred new inventions could be seen, which disappeared from public notice almost as quickly as they came. Everything pertaining to this art seemed to bear upon its face the evidence of uncertainty. Everywhere it was noteworthy that the apparatus did not seem to be based upon profound comprehension of the subject, and upon thorough understanding of physical laws which were included by it, but on the contrary all things seemed to have been constructed upon a basis of opinions and often upon erroneous and superficial ones. The object, which was aimed at in these various inventions seemed to be to produce an effect, to amaze and astonish people, for this always produces a profound impression upon those who are superficial in their examinations and in their judgments.

In the years 1898 and 1899 the general impression in regard to the technique of the Roentgen ray apparatus among physicians was as follows: The greater the length of the spark the better would be the apparatus. The number of interruptions in the current must be so great that the light in the tube would not flicker. Accumulators or storage batteries served as a means of current supply, or the connection was made with the current circuit of a public lighting plant. In the latter case suitable means had to be provided for lessening its strength and tension by appropriate resistance apparatus. The mercury interrupter was generally in use. The X-Ray tubes with arrangements for the regeneration of the vacuum were beginning to become known, and were regarded as valuable. The Tube itself was gradually being constructed with a heavy anti-cathode, the latter sometimes with surrounding or connecting chamber by which the anti-cathode could be cooled with a current of water when tube was in use.

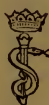
There was an abundance of unnecessary and inferior apparatus upon the market. People had not yet learned to protect their eyes at each transillumination, most methodically, from actinic light, and they still worked with the fluorescent screen in imperfectly darkened rooms.

The relation between the degree of vacuum which is produced in a tube the power of penetration of the X-Rays, their chemical effect, and the formation of secondary rays were questions which were not as yet generally understood. It often happened that one obtained bad results or results that were lacking in uniformity. As to the cause of the bad results the explanation was not yet at hand.

There was a great deal of literature and a great deal of uncertainty upon the subject. The text books gave defective explanations in regard to the actual physical structure, the process of induction and the real method of procedure with the apparatus. The physician, however good his intentions may have been, was not in a position to find just where he stood quickly and accurately in regard to procedure. He, however was allowed to pay the bills for finding out all these things and he gradually became inclined to withdraw from the practice of radiology. His experience became less and less satisfactory on account of the inconstancy of his results, and there was a perceptible reaction which discredited the illusions of earlier years.

During this period two events occurred which gave their impression to the epoch which followed. One of these events was the invention of the *electrolytic interrupter* by *Wehnelt* in 1899. In this instrument was produced an interrupter of *unprecedented* efficiency, the frequency of its interruptions exceeding that of all others which had previously been devised to an enormous degree, and eliciting from the induction apparatus real bands and showers of sparks. In certain cases in which it was tried it soon succeeded in shortening the time of exposure compared with that which had usually been required. It is easy to understand how the attention of all, who were concerned in this subject, was quickly turned to this new discovery. Wanting in discretion as the market was it took possession of this treasure without hesitation.

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Those who were concerned only about the sufficiency of the current believed they could not get along without the new apparatus. People expected everything from it even to the perfection of the entire *Roentgen* technique. They expected the time of exposure to be limited to a moment, and absolute certainty in results, in which particular they had hitherto failed. They expected too much, and the result in many cases was disappointment and reaction. Not that *Wehnelt's* discovery was unimportant, or the progress which had been brought about by his efforts was not noteworthy; but the fact was overlooked that from the laboratory experiment to the practical employment of the finished structure was a long step, and much labor and labor too of a technical character was necessary before this step could be taken.

The electrolytic interrupter also had disadvantages which, under certain circumstances, could be and were full of annoyance. It disabled the X-Ray tubes then on the market, made many of the instruments to which it was attached uncontrollable, and in many instances would not work at all. It became hot after it had been in continuous use for some time, and was often out of order, in short it was a source of annoyance. The fact was that the instrument was not yet perfected in itself, and the whole armamentarium had to be differently constructed so as to adapt it to the requirements of *Wehnelt's* invention. Failure to obtain the results which had been anticipated with this new electrolytic interrupter once more proved a drawback to the whole system of treatment. Disappointments had already been numberless, and now this new invention, which had been seized with such confidence and hope had proved an additional disappointment. The impatience, the want of confidence on the part of physicians steadily increased. More and more the experience which had been gained seemed to be relegated to the hands of a few specialists, the general practitioner being entirely left out. A wide-spread suspicion of the whole method prevailed.

Other forms of electrolytic interrupters were also placed upon the market, but they had even fewer merits than *Wehnelt's* to stimulate the confidence of those who were relied upon to buy and use them. The confidence which was essential to effective co-operation between mechanical art and medicine had received a staggering blow.

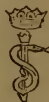
At an exposition of *Roentgen* apparatus in Hamburg (subsequent to 1900) an improvement in the primary of an induction apparatus was exhibited which is known as the *Walter regulable Inductance*. *Walter* proved experimentally that the tension of the secondary closing current increases in direct proportion with the amount of primary tension, and in almost inverse proportion with the amount of self-induction in the primary coil. By increasing the amount of self-induction in the primary coil the closing tension in the secondary coil becomes therefore diminished, whereby the life and scope of regulation of a "soft" X-Ray tube are considerably augmented. If one diminish the self-induction, for instance, by sending the primary current through fewer windings of the wire, a greater current strength must be employed if the magnetic and inductive effects are not to be impaired.

The new induction apparatus which *Walter* exhibited had the primary coil wound for the purpose of variable self-induction. This was effected by arranging the windings of the primary coil in several divisions, and allowing the current to flow through one, two, or more of the divisions by means of a suitable switch.

In combination with *Walter's* improvement on the induction apparatus the problem of successfully employing *Wehnelt's* invention of electrolytic interrupter was solved.

Other important discoveries had been made to which attention must now be called. One was the discovery by *Moritz, of Munich*, which is known as orthodiagraphy. It consists in a method for determining the actual size of the internal organs of the body by means of X-Rays. It has been of especial service in giving exact measurements of the heart, and as it can be con-

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trolled with exactness and precision, it has been of great service in* the practice of internal medicine in preventing errors of diagnosis.

The other discovery was that of *Hildebrand*, who introduced *stereoscopy* into the *Roentgen* method of treatment. By its aid one can not only determine the depth at which foreign bodies are located, but can actually see in a plastic condition the arrangement of the bones and other tissues. This discovery was of especial importance as an aid in teaching anatomy.

Some two hundred methods of measuring have been devised for the purpose of determining with accuracy the position of foreign bodies which may have become lodged in the internal organs. Some of them have been applied with and some without the assistance of mathematics. *Benoist* has constructed a scale which is the first which has been found practicable for measuring the average power of penetration of the X-Rays.

Sagnac investigated the secondary rays in 1900, and he with other French investigators was the first to endeavor to overcome their harmful effects in examinations and in transilluminations by protective boxes and diaphragms.

A practical method of procedure for general purposes, however, was only available when *Wiesner* and afterward *Albers-Schönberg*, though quite independently, had improved the apparatus, and had introduced the elements of compression into the method. At the present time the diaphragm method of controlling the secondary rays is employed in every properly equipped *Roentgen* institute.

Radiotherapy, the treatment of various diseases of the skin, and especially the treatment of cancer, which had first been suggested by *Freund* of *Vienna*, had brought forth results which have filled the world with amazement. Still the results obtained by individual investigators lacked uniformity as long as there was lacking also the means of administering the X-Rays, as a therapeutic agent, with precision of dosage.

In 1901-2 *Holzknacht* invented his *chromoradiometer*, which is a satisfactory and accurate measuring instrument for this purpose. Since this discovery was made practical it has become possible for medicine to lay down exact statements for its investigations in this direction.

At about the same time that *Holzknacht* made his discovery *Dessauer* made his first *Roentgen* tube. With this tube one is enabled to change the power of penetration of the X-Rays without changing the vacuum, by means which are entirely electrical, namely, by changing the potential of discharge of the cathodal rays. This method has been of especial importance in the practice of internal medicine.

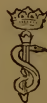
Levy and *Gundelach* in 1902 completed the so-called throttling or valve tubes which are connected in series with the *Roentgen* tubes. By their use the life of the tube is considerably lengthened.

Under the stimulating influence of different investigators, but especially that of *Albers-Schönberg* and *Holzknacht* particular attention has recently been paid to various contrivances for protection from the harmful influences of the X-Rays. Sheets of lead glass, which is impermeable to the rays though quite as clear as plate glass were brought into use. *Holzknacht* covered lead foil on both sides with pure rubber sheeting which could be used as a kind of aseptic mask.

Grisson constructed a powerful and useful current rectifier for use in the *Röntgen* apparatus, on the basis of the *Gratz cell*.

These, in a few words, have been the most important events in all that pertains to the *Roentgen* method, from the time of the discovery of the epoch making phenomenon until now. Revived interest is beginning to be manifested in this diagnostic and therapeutic agency, the most beautiful gift which physics has ever made to the science of medicine.

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Not that the X-Ray has superseded the clinical diagnosis; on the contrary, the latter combined with the results obtained by the X-Ray, insure greater precision for both diagnosis and therapy.

The X-Ray has become one of the most important factors in the Medical Armamentarium, its utilization has been rapid and extensive and, though much has already been accomplished, its field of usefulness is probably far from the limit of its possibilities. Rapid as the advancement has been in perfecting efficient apparatus, there yet remains much in the physics of the question which is obscure and awaits further investigation and elucidation.

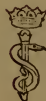
In presenting this present edition of our X-Ray Catalogue, we desire to state that the apparatus which is mentioned is made in our own factory by skilled mechanics and under the supervision of thoroughly competent electrical engineers.

With no intention of dwelling upon its merits in detail, we have no hesitation in stating that our apparatus in point of efficiency, reliable construction, and beauty of appearance is not inferior to the product of any establishment in this country or any other.

Respectfully,

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TERMS.

THIS Catalogue supersedes former editions and all previous quotations are herewith cancelled.

When describing apparatus please refer to catalogue numbers so as to insure accurate execution of orders. The privilege is reserved to deviate from details of designs as represented by illustrations whenever by desirable changes in construction the efficiency of an apparatus can be improved.

All the goods quoted in this catalogue are ordinarily kept in stock, so can be forwarded within a reasonably short time after receipt of order. The latter will be acknowledged promptly and the probable date of shipment given.

Whenever instruments and apparatus have to be made specially to order, and vary from our regular catalogue patterns, a deposit equal to 25% of their approximate value must be paid in advance. Such special goods cannot be returned for credit or exchange.

In the absence of specific instructions goods will be despatched by the route that commends itself to our judgment as the most expeditious, secure and economical.

We employ a staff of skilled packers and use every precaution to insure safe transit. Goods are delivered by us free to transportation company and after obtaining from the latter receipt acknowledging that our shipment has been taken over **"in good order"** our responsibility for damage or breakage ceases.

We are prepared to insure our goods against damage or breakage in transit at the following rates:—

SEVEN PER CENT. of invoice value on all glass ware including X-Ray tubes.

THREE PER CENT. of invoice value on all other apparatus.

OUR TERMS are net cash. All accounts due and payable after 30 days from date of invoice; interest to be charged on accounts overdue.

A cash discount of 2% will be allowed on all bills paid within ten days from date of invoice.

It is desirable that names and addresses of customers should be distinctly written. Prospective purchasers will facilitate prompt execution of their orders by furnishing New York Trade references as to their financial responsibility.

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ANNOUNCEMENT.

Information in this catalogue and cuts of apparatus are published for the instruction and convenience of our friends and patrons. It should be remembered, however, that owing to the rapid rate at which the electrical science is advancing at its present stage, our designs must necessarily be in a state of continuous transition, as we develop and perfect the apparatus. The description given herein must therefore necessarily become obsolete in certain details as time goes on. This catalogue will however serve as a guide in a general way and information on improvements if desired, will be cheerfully furnished upon application.

We solicit correspondence with prospective buyers of all kinds of Electrical Apparatus. Our interest in a transaction will not cease until the articles have been delivered and been found by our friends to be fully as represented. The interests of our patrons are therefore identical with our own, it being our aim to make each of our products a permanent advertisement and a silent salesman.

When writing for information it is requested that full details may be given regarding the most important points which we require to know in order to advise intelligently. As: Source of current available, its voltage and (in case of alternating current) the number of cycles. It is also important to be informed of the character of work for which the apparatus is intended. Time and correspondence may be saved by giving approximately the size and type of induction coil desired and also the amount of money within which our correspondents desire to keep the total of their investment for an equipment.

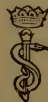
Whenever a personal selection of the apparatus is possible we advise this as the most satisfactory mode of purchasing.

We are maintaining a complete and fully equipped sample exhibit at our salesrooms and cordially invite inspection.

The principal apparatus required for an X-Ray equipment are the following:

1. *Induction Coil, mounted on a cabinet stand or wall brackets.*
2. *Interrupter (Wehnelt's electrolytic, Mercury Jet, etc. etc.)*
3. *X-Ray Tubes.*
4. *Tube Holder.*
5. *Rheostat plain or Switchboard with Voltmeter and Ammeter.*
6. *Fluoroscope.*
7. *Plate Holders for skiagraphic work.*
8. *Intensifying screen (especially useful for skiagraphic work with small size induction coil.*
9. *Examining and Treatment Table.*
10. *Photographic Equipment.*

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SOURCE OF ELECTRIC CURRENT.

The ordinary electric current is not suitable for exciting the X-Ray vacuum tube until it has been transformed from low to high tension. This result is accomplished by means of the induction apparatus (*Ruhmkorff's Coil*).

The Quantity and Quality of the induced current, according to the size of the coil, depends upon the interruptions of the Primary current, whether slow or rapid, irregular or regular, hence for the various electric currents which are obtainable the same kind of interrupter cannot be employed.

Direct electric current of 110 or 220 volts E. M. F.

If one is fortunate enough to have at his disposal a *direct current* of 110 or 220 volts the most perfect installation of an X-Ray equipment can be made with the least expense.

Wehnelt's electrolytic, Mercury jet, or magnetic interrupters can be employed for this purpose.

Direct electric current of 500 volts E. M. F.

This current cannot be used without being transformed by a *Rotary converter* to a lower voltage of 110 or 55 volts.

Direct current of from 12 to 24 volts or more

This voltage can be obtained from Storage batteries or Primary cells. For currents of low voltage *mechanical interrupters* must be employed, viz.:

Magnetic Interrupters, Turbine Mercury and Mercury Jet Interrupters. For Storage Batteries of 50 volts and more the *Wehnelt Electrolytic interrupter* is the most suitable. (A Battery power of 60 or 70 volts is to be recommended.)

In many cases the storage battery of an automobile, giving about 100 volts, may be utilized. This combination may be considered an ideal portable X-Ray outfit. The induction coil and other accessories can be easily transported in such a vehicle, the apparatus set up completely at the bedside of the patient and connected by conducting cables with the storage batteries of the automobile, which remains standing in the street.

Alternating current of from 65 to 130 volts E. M. F.

For this current the *electrolytic Wehnelt* interrupter is most appropriate, but the platinum electrode of the interrupter is more sensitive to the alternating than to the direct current (during one hour's constant use with a primary current of 15 ampères one gramme of platinum is dissolved). This makes the employment of the alternating current when the apparatus is in daily use, somewhat expensive.

The Mercury Turbine interrupter with synchronous motor as quoted in Fig. G/5703 may be recommended for treatment purposes as being more economical. It may be operated continuously without trouble and will give good results for fluoroscopic examinations. It will also answer the purpose for radiography of extremities.

In cases in which the cost for the first investment is not a consideration of great importance we recommend the installation of a *converter* for transforming the alternating into the constant current. For specifications and descriptions of these transformers we refer to the Chapter on "Rotary Converters." (G/6000 to 6013).

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INDUCTION COILS.

The inductor first constructed by RUHMKORFF in Paris, in 1855, has undergone considerable modification, and the apparatus now known as the RUHMKORFF induction coil differs greatly from the original instrument.

The demand, too, is greater and with it the requirement for efficiency. Its main component parts consist of the Primary and Secondary coil. Upon a well insulated core consisting of a bundle of Swedish soft iron is wound the primary coil which consists of a layer of coarse copper wire.

The current passes through an interrupter and a rheostat before entering the primary coil. In order to adapt the coil to sources of different potentials *the primary windings are arranged in multiple layers*, the connection of their terminals being such that they can be employed in different combinations.

The Secondary coil consists of a series of spools upon which many thousands of yards of fine silk-covered and well-insulated copper wire are wound. The terminals of the wire connect with two binding posts. All our induction coils are manufactured in a vacuum and are guaranteed of the highest efficiency.

Good results can be obtained with small induction coils upon the hand, forearm, leg and foot, but *it is generally conceded by X-Ray authorities that the best results can only be obtained with strong coils.*

A large size inductor will do all the work which a smaller size can do, with less volume of primary current. It will work to perfection with the various grades of X-Ray tubes from the soft ones to the very hard and highly evacuated ones.

The higher the vacuum of the tube the more energy is required to so excite it as to obtain the penetrating effect of the rays. An X-Ray tube which may have become hard, but is still useful, and which cannot be excited with a small induction coil, can be used to advantage on a larger coil. For the examination of the denser portions of the body, such as the pelvis and the spinal column, and for the outlining of concretions, a small coil is useless.

A special feature of our coils (Type B) for use with *Wehnelt's* electric interrupter is the Primary which is constructed on

WALTER'S VARIABLE INDUCTANCE PRINCIPLE

whereby the capacity of the coil may be adapted to the vacuum of the X-Ray tube.

This is accomplished by winding the Primary in several divisions thus allowing the current to pass through one, two or more of these divisions and by connecting the individual windings serially, in groups or in parallel.

When using soft X-Ray tubes the self-induction of the Primary is considerably increased by connecting the windings serially.

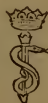
When using medium tubes the windings are connected in two groups, and

When using hard tubes the windings are connected in parallel whereby the self-induction is diminished.

While we are prepared to furnish induction coils of any size and length of spark that may be desired, we recommend for the best work coils of from 14 inches upward.

We manufacture Induction coils in a series of standard sizes as specified in schedule. Intermediate sizes we do not make, since by careful adjustment of the interrupter, an excess of from 10 to 20 per cent. of spark-length can readily be obtained.

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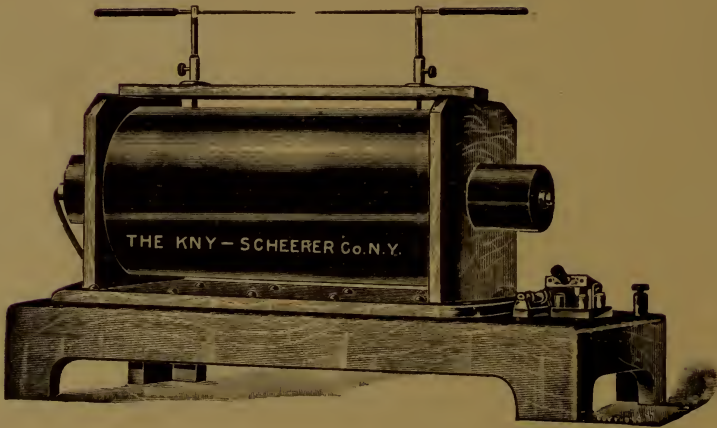
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THE KNY-SCHEERER CO.'S INDUCTION COIL—TYPE A.



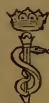
THE KNY-SCHEERER CO.'S INDUCTION COIL—TYPE B.

Type A—Inductors are placed into a highly polished hard wood box. The Secondary being imbedded in a mass of wax, preserving insulation in a perfect way.

Type B—Inductors are mounted on solid hard wood bases. Both ends and enveloping shell are of solid, highly polished hard rubber. The Secondary windings are insulated with greatest care and perfect balance exists between each section.

The Primaries of all coils upward of 12 inches are provided with “**Walter’s Variable Inductance**”

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PRICES FOR KNY-SCHEERER CO.'S INDUCTION COILS.

TYPE A.				TYPE B.			
Catalogue No.	Code Word	Length of Spark	Price	Catalogue No.	Code Word	Length of Spark	Price
G/5600	NAB	8 in.	\$100	G/5624	NAJAD	8 in.	\$110
G/5601	NABAT	10 "	125	G/5625	NAKYB	10 "	135
G/5602	NABEL	12 "	175	G/5626	NALIF	12 "	190
G/5603	NABOB	14 "	215	G/5627	NAMAZ	14 "	240
G/5604	NACHA	16 "	270	G/5628	NAMSO	16 "	300
G/5605	NACRE	18 "	300	G/5629	NANCY	18 "	340
G/5606	NADAR	20 "	350	G/5630	NANDU	20 "	390
G/5607	NADEL	22 "	450	G/5631	NANNI	22 "	500
G/5608	NADOW	24 "	500	G/5632	NAPIR	24 "	550
G/5609	NAFLO	26 "	550	G/5633	NAPOL	26 "	620
G/5610	NAGAS	28 "	600	G/5634	NARBE	28 "	700
G/5611	NAGYA	30 "	760	G/5635	NARDO	30 "	850

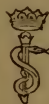
INTERRUPTERS.

The function of the interrupter is to break the Primary current very suddenly, completely and equally, and the efficiency of an Induction Apparatus depends very largely upon the selection of an interrupter suited for the source of energy and proper adjustment.

Interrupters may be divided into three different classes, viz. :

- (1) Magnetic or vibrating interrupters in which the interruption is produced by the separation of two solid pieces of metal which are in contact.
- (2) Mercury interrupters in which the interruptions are effected by the contact of Mercury with a piece of solid metal.
- (3) Electrolytic interrupters in which the interruption takes place between an electrolyte and a metallic conductor or between two electrolytic conductors.

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MAGNETIC INTERRUPTERS.

The principle of the Magnetic Interrupters is the following:

When the current circulates through the primary coil it makes the iron core magnetic, attracts the armature, and by pulling the contact attached to the spring away from the fixed contact, breaks the circuit. Immediately the core demagnetizes, and the spring carrying the armature makes contact again with the fixed point.

Magnetic Interrupters are best suited to coils wound to operate on a current of not exceeding eight ampères, and give much the best results on low potentials (from 20 to 60 volts) but special types of construction may be used successfully on higher potentials (not exceeding 110 volts), if not more than five ampères are required to operate the coil.

MERCURY INTERRUPTERS.

Mercury interrupters are suited for currents of low and medium voltage. An independent motor with rheostat serves to control the revolutions and interruptions. Of the various types which are in use the Mercury Jet interrupter is the best as it will not wear out rapidly with currents of high voltage. The mercury should be covered with a layer of kerosene oil or alcohol.

ELECTROLYTIC INTERRUPTERS.

The various types of electrolytic interrupters may be divided into two classes:

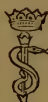
- (a) WEHNELT Electrolytic Interrupters and
- (b) Diaphragm Interrupters of the CALDWELL, SIMON and other types.

The principle upon which the construction of the WEHNELT Interrupter is based is as follows: A suitable jar is filled with diluted sulphuric acid of a specific gravity of 1.20. A platinum wire of large caliber is passed through a tube of hard bisque-porcelain, its end projecting into the sulphuric acid solution. The extent of projection of the platinum tip can be regulated by means of an adjusting screw, the number of interruptions depending largely upon the area of platinum surface exposed to the electrolyte. A lead cathode of considerable area is immersed in the fluid and connected with the negative pole, while the platinum electrode is connected with the positive pole. No condenser is required. When the current is turned on the electrolytic process at once decomposes the fluid into oxygen and hydrogen at the platinum tip and causes rapid breaks by enveloping the platinum with these gases. Interruptions up to 10,000 per minute can be obtained, according to the strength of the current and the adjustment of the platinum electrode.

The Diaphragm Interrupter of CALDWELL is constructed on similar principles. Into a jar containing diluted sulphuric acid is placed a beaker of hard bisque porcelain in which is a small hole. Lead electrodes are placed in the outer jar and in the insulating cup.

When the primary current of the induction coil is passed through this apparatus there is comparatively little heating of the liquid except in the aperture connecting the two chambers where the current density is very great on account of the small aperture. Here the liquid is vaporized and bubbles of steam, which are continuously forming, break the connection between the liquid in the inner jar and that in the outer jar. The frequency of the interruptions depends largely upon the strength of the current, the size of the aperture and the resistance of the electrolyte.

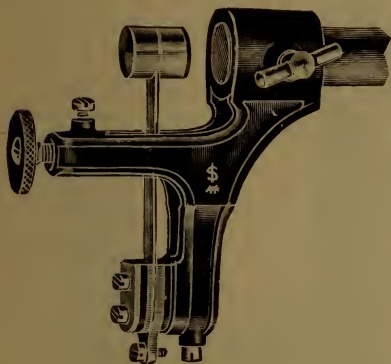
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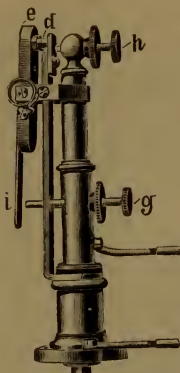
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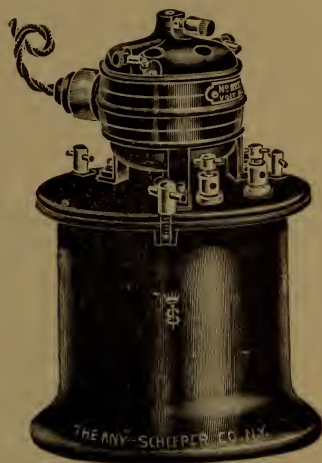
Telegraphic Address: EXRAY-NEW-YORK.



G/5690



G/5694



G/5697

G/5690 Platinum-Hammer-Contact Interrupter, suitable for use in connection with Storage Batteries, Primary Cells etc. of small voltage. The instrument is directly connected with the Inductor, the primary of which is elongated and provided with an attachment for connection. It can be readily detached whenever another type of interrupter shall be employed.

Code NATIO

Price..... \$20.00

G/5694 Self-Starting Platinum Contact Interrupter, Special Pattern. A very efficient instrument which can successfully be used with direct currents of 110 volts.

Code NATOL

Price..... 35.00

G/5697 Mercury Turbine Interrupter, for direct currents of 65, 110 and 220 volts. Interruptions of from 10 to 100 per second can be obtained. Additional segmentation rings varying in size and number of segments can be supplied whereby the interruptions may be varied.

Code NATTE

For direct current of 110 volts 50.00

Code NATUR

For direct current of 220 volts..... 55.00

Code NATZO

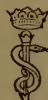
Extra Segmentation Rings.each 5.00

For filling the apparatus requires:

24 ounces (850 c. c.) of 95% Alcohol (not wood alcohol).

120 ounces (260 c. c.) of Metallic Mercury.

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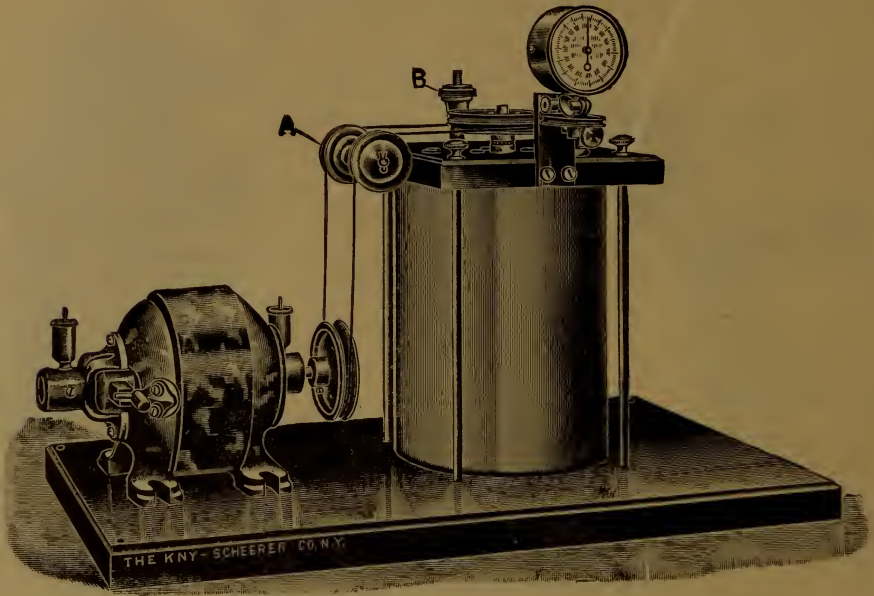


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G/5700

G/5700 Mercury Jet Interrupter for direct currents up to 220 volts. A most satisfactory and economic apparatus, using very small amount of current. The Segmentation Rings and the Mercury are placed into a glass vessel thus being under observation and control.

Code NAUKY	For 110 volts.	Price without mercury.....	\$75.00
Code NAUMA	" 220 " " " "	80.00

G/5703 Mercury Turbine Interrupter with synchronous motor for Alternating Current.

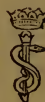
Code NAUNO

This instrument interrupts the current once in either phase and at the moment of maximum intensity. The rapidity of the interruptions is determined by the periodicity of the main and is capable of no variations. The motor is to be started by a fly wheel driven by hand power until the required speed is attained.

When ordering always specify Voltage and number of cycles.

Price..... 135.00

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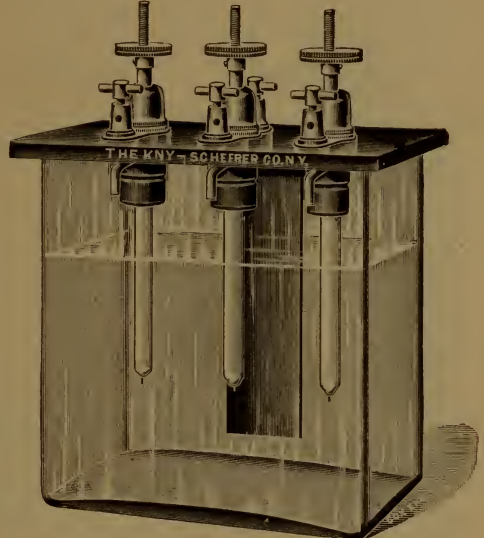
THE KNY-SCHEERER COMPANY, New York.

Telegraphic Address: EXRAY-NEW-YORK.



U. S. PATENT, MARCH 19th, 1901.

G/5708



U. S. PATENT, MARCH 19th, 1901.

G/5711

G/5708 Electrolytic Interrupter. WEHNELT'S PATENTED single Platinum Electrode.

Code NAUPO KNY-SCHEERER Co's Type. The apparatus is durably constructed, porcelain vessel being surrounded and protected by a metal cooling jacket.

Price \$30.00

G/5711 Electrolytic Interrupter. WEHNELT'S PATENTED German Type with three

Code NAVAL platinum electrodes for coils with Walter's variable self inductance.

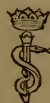
Price. 60.00

NOTICE.

Attention is herewith drawn to the fact that we have acquired by purchase *U. S. Patent*, March 19th, 1901, covering WEHNELT's invention of Electrolytic Interrupter and that we shall protect our rights by prosecuting all infringements which may be brought to our notice.

WEHNELT's Electrolytic Interrupters, if genuine, must bear our *Trade Mark* and in addition our Firm Name and registered Factory Number.

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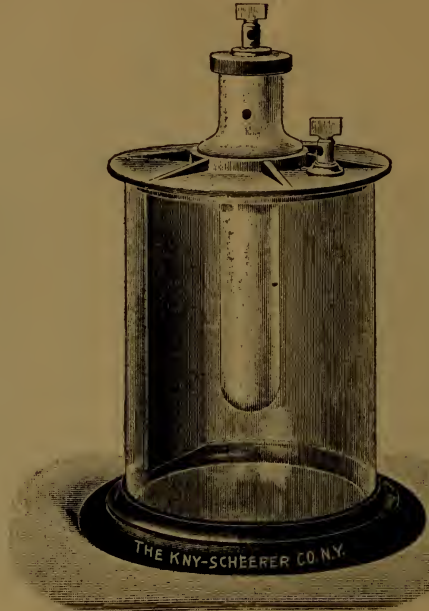
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G/5719

U. S. PATENTS JULY 2nd, 1901.



G/5720

G/5719 Electrolytic Interrupter , CALDWELL'S, as described, under Diaphragm	
Code NAXOS Interrupters Page 18.....	\$15.00
G/5720 Electrolytic Interrupter , SIMON'S, suitable for continuous and alter-	
Code NAZIR nating current	20.00

CONDENSERS.

Condensers are assisting in the storage of electricity to a higher degree.

The making and breaking of the primary circuit induces alternating currents in the secondary.

The breaking of the primary current will momentarily produce by induction a slight current in the opposite direction called **self-induction**.

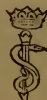
For the purpose of absorbing and storing this self-induced current condensers are used. The current absorbed by the latter is discharged a moment later through the primary coil, thus creating a current in the opposite direction which demagnetizes the core and thus greatly adds to the efficiency of the coil.

Condensers are required for use with all interrupters except those of the electrolytic type. We manufacture only one style, viz.: that of the best mica insulation, carefully joined and cemented together by a vacuum process. All air being thus excluded the highest efficiency is secured.

According to type of induction apparatus we place them either inside of the case holding the coil proper (Type A) or underneath the base of coil (Type B). Condensers can also be furnished in a separate wooden box upon which the interrupter is mounted.

Prices according to size of coil vary between \$25.00 to \$60.00

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X-RAY TUBES.

Next to the inductor and the interrupter the *Roentgen* tube represents that part of the equipment upon which success almost entirely depends. It is sometimes possible to obtain satisfactory results from a poor X-Ray outfit if a good tube is used, but the best equipment is useless when a poor tube is connected with it. It must also be remembered that it requires large experience and care to select tubes suitable for the particular apparatus, and that the same X-Ray tube in the hands of different operators will not uniformly give the same results. A tube which proves eminently satisfactory in the hands of one may disappoint another and vice versa.

According to permeability and thickness of the object to be skiagraphed, tubes of low, medium low, high and very high vacuum should be used.

Tubes having a **low vacuum** are called "**soft**," they are suitable for the bones of the hand, foot, ulna and elbow joint, and an exposure of from 5 to 30 seconds will give fine skiagraphs.

Tubes having a **medium low vacuum** are called "**medium soft**," They are used for the knee joint, shoulder, thigh, etc., a skiagraph requiring an exposure of from 25 to 60 seconds.

Tubes having a **high vacuum** are called "**hard**," and serve for skiagraphs of the chest, spine and pelvis; they require an exposure of from 40 to 60 seconds.

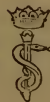
Tubes having a **very high vacuum** are called "**very hard**," the rarefaction of the intratubal air having been carried to the maximum point. The intensity of the rays obtained with these tubes is the greatest possible.

The usual test object when selecting tubes is the human hand held in front of the Barium Platinum Cyanide screen. It includes bones together with soft parts of varying thickness. With a soft tube the bones of the hand will appear deep black and the soft parts dark. The bones of the wrist and the canals of the long bones are invisible. With a medium soft tube the bones of the hand appear greyish black and the soft parts very light. The canals of the bones are easily discernible, and the different wrist bones can be distinguished. With hard tubes the bones are light grey in appearance, and the soft parts light and shadowy.

The degree of vacuum in a tube is not permanent. At first a tube becomes softer when in use, because the particles of air which adhere to the tubal walls are detached from it by the warming influence of the current. After the tube has cooled it becomes harder again because the particles of platinum dissipated from the glowing anticathode, while cooling, meet molecules of air in the interior of the tube. The longer a tube is used the less will be its volume of air, so that finally there is too little intratubal air to permit the passing of a current.

We suggest that the X-Ray tubes, when not in use be kept in a closet having a uniform temperature, the shelves of which are padded with soft cloth.

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We constantly carry in stock a very large assortment of X-Ray tubes of different constructions and are prepared to supply tubes for **Static Machines** or **Induction Coil Apparatus** from the smallest size up to the very largest and most powerful ones.

Following we mention the principal types which we are describing in particular by illustration hereafter.

REGULAR BI-ANODE X-RAY FOCUS TUBES.

(Figs. G15820 to 5829)

These tubes have three electrodes which fact gives to them some advantage in the regulation of the resistance.

The electrodes are so arranged that the rays produced proceed from one point only, whereby considerable intensity is attained.

For this purpose an aluminum concave mirror is used as cathode. A small platinum plate—the anti-cathode—is fixed opposite the center of the latter. This anti-cathode is so placed that it coincides with the apex of the cone of cathodal rays emanating from the concave mirror, and these rays moreover strike it at an angle of 45°.

A device for regulating the vacuum of the tube is attached to some types.

WATER COOLED X-RAY TUBES.

(Figs. G15832, 5845, 5856.)

The efficiency of an X-Ray tube is limited by the fact that when the cathode rays have attained a certain intensity, the anti-cathode gets red hot, and if the platinum be allowed to glow very much it has the well-known tendency to absorb gases on cooling, and so heighten the vacuum.

In order to cope with powerful current supplies having rapidly succeeding interruptions—such as for instance, obtained when using *Wehnelt's* electrolytic interrupter—tubes have been made with cooling chambers adjoining the anti-cathode. The excess of heat generated in the anti-cathode is absorbed by the water which is filled into this chamber which moreover tends to diminish the dispersion of the platinum. By this water cooling attachment in direct contact with the anti-cathode any great and rapid increase in the vacuum of the tube is prevented which would inevitably be accompanied by some loss of efficiency.

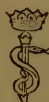
X-RAY FOCUS TUBE WITH VACUUM REGULATION ON THE OSMOSIS PRINCIPLE.

(Figs. G15840-5845.)

The function of the Osmosis Vacuum Regulator is based upon the fact that heated platinum is penetrable by hydrogen. The focus tube has a small side chamber with a platinum point fused in and covered by a glass tube. In order to reduce the vacuum of the tube the platinum is heated by an alcohol flame or gas burner. The hydrogen gas produced thereby gains access to the interior of the glass bulb and reduces the vacuum. This can most conveniently be done while the tube is working so that the degree of vacuum can be gauged by the color of the fluorescence.

The glass of which this tube is made contains powdered Potter's earth and chlordinium, a flux which allows double the ordinary amount of rays to pass.

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THE MUELLER SELF REGULATING X-RAY TUBE.

(Figs. G/5840-5852)

This tube has an auxiliary chamber and an adjustable regulating spark gap. The regulating discharge passes directly into the auxiliary chamber through a bundle of mica discs and lowers the vacuum of the tube by driving off occluded gas from them. It has also a device for raising the vacuum when it becomes too low. This is very useful when the lowering of the vacuum has by accident been carried too far.

The *Mueller* tubes have for years enjoyed an enviable reputation, and are recognized as being the best X-Ray tubes produced. Special descriptive pamphlets will be mailed upon application.

X-RAY TUBES FOR THERAPEUTIC PURPOSES.

(Figs. G/5870 to 5883)

The selection of X-Ray tubes for treatment purposes is an easy matter, as almost any of the ordinary forms of tubes will answer. Definition too is of little importance, neither is the regulation of the vacuum.

By means of suitable forms of endoscopic instruments one may employ the regular forms of X-Ray focus tubes by adjusting and securely fixing them to the speculum, and by maintaining carefully the relative position between both.

A variety of different forms of tubes for therapeutic purposes have been designed for the treatment of cavities in the body. They are generally single focus tubes with a prolongation which is introduced into the cavity. The rays in these tubes are projected in the direction of the prolongation.

VALVE TUBE.

(Fig. G/5890)

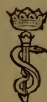
The Valve Tube (Ventile Tube) is intended to steady the flow of the current through the X-Ray tube.

If currents of great intensity are used the platinum discs of the tubes become red hot and the outlines of the picture become indistinct after long exposure.

A valve tube, consisting of a small evacuated glass bulb, which is provided with anode and cathode only, connected in series with the *Roentgen* tube, will obviate the heating of the X-Ray tube, permit longer exposures, and increase definition.

Valve tubes are particularly well suited in cases in which the alternating current is used.

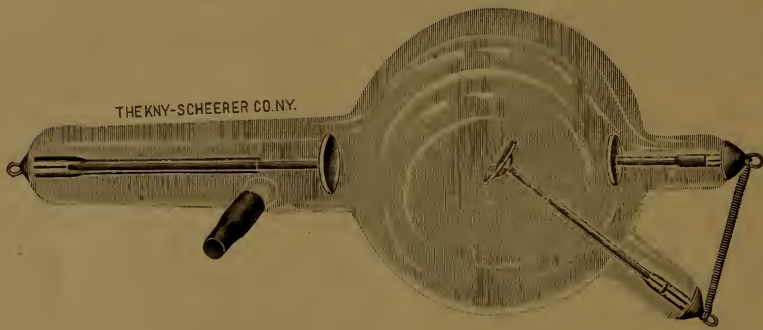
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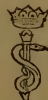
G/5820

G/5820 [Plain Bi-Anode X-Ray Focus Tube. A good type of X-Ray tube for static machine or small coil. It has three electrodes which assist in keeping the vacuum uniform.

Code NEGDA	20 cm., = 8 in. spark.....	\$ 6.00
" NEG01	25 " = 10 " "	7.50
" NEGRO	30 " = 12 " "	8.50
" NEIDA	35 " = 14 " "	9.50
" NEKYA	40 " = 16 " "	11.00

Always state length of spark when ordering for a coil-apparatus or number, and size of revolving glass plates when tube is to be used on a static machine.

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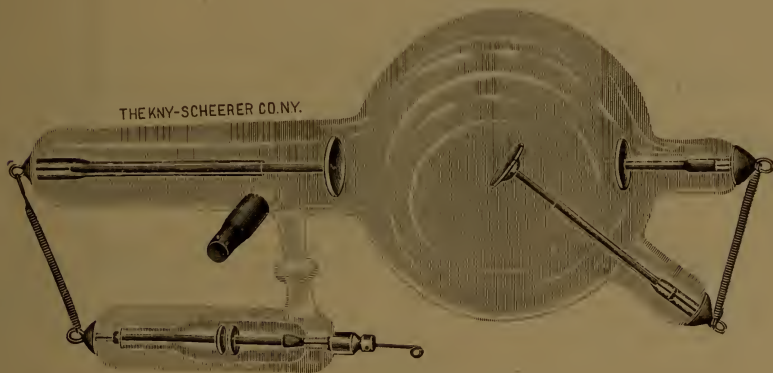


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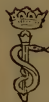
G/5824

G/5824 Bi-Anode X-Ray Focus-Tube, with device for regulating the vacuum.

The regulating attachment consists of an auxiliary chamber containing two electrodes which will give off a small volume of gas by electric discharge passing through it. This is effected by attaching anode wire into small hook on top of auxiliary chamber, and allowing current to pass for a few seconds, than re-attach to anode. This process can be repeated as often as necessary, but special caution is recommended to prevent tube from becoming too soft.

Code NELUM	25 cm., = 10 in. spark.....	\$12.00
" NEMEA	30 " = 12 " "	13.50
" NENIA	35 " = 14 " "	15.00
" NEOLO	40 " = 16 " "	18.00

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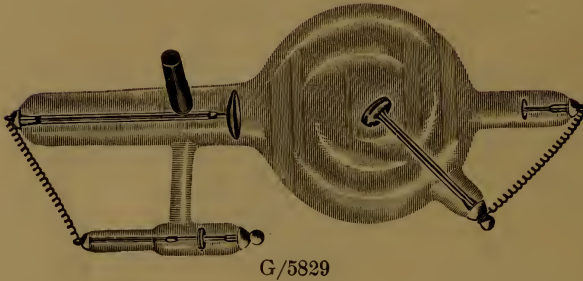


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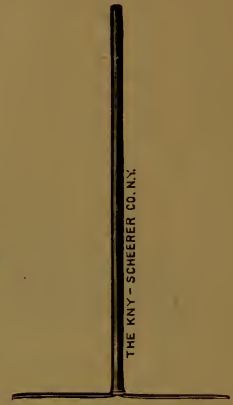
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THE KNY-SCHEEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.



G/5829



Insulated Connector.

G/5829 X-Ray Focus Tubes, with arrangement for regulating vacuum. These tubes are especially adapted to static machine work, but can be used on coil for short exposures. They will not stand the heavy discharge from large coils for any great length of time; however, great penetrating power is obtained and not at the expense of definition. They are also very easy to regulate.

Code NERIO

DIRECTIONS.

When vacuum becomes too high simply bring insulated connector in close proximity to the two balls on back of tube for a few seconds, while current is passing through same, this will lower vacuum to any degree desired. Care must be taken not to allow connector to remain in circuit too long, as the vacuum may be drawn down too low for use. In case this should occur, however, it will be necessary to use the tube several times with spark gap.

Price for tube, 40-45 cm. **\$20.00**

In ordering always state length of spark for coil, or number and size of Revolving Glass plates, if tube is to be used on a static machine.

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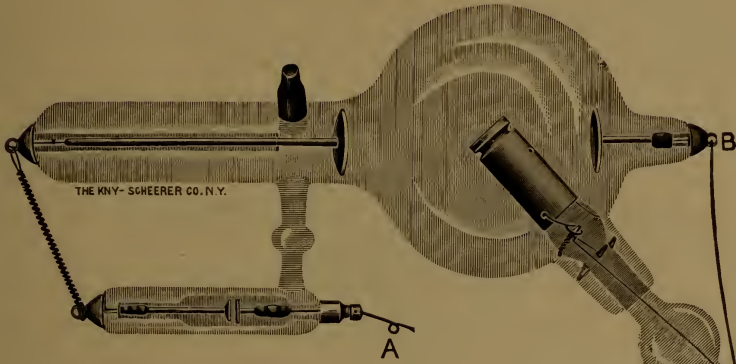
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THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

THE KNY-SCHEERER CO.'S REGULATING X-RAY TUBE with water cooling attachment.



G/5832

G/5832 {X-Ray Focus Tube, with water cooling chamber for anode and vacuum regulator.

Above illustration represents a water-cooling tube with regulating attachment. It is the product of careful study and long experience in the X-Ray Tube business.

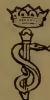
In addition to the watercooling features this tube has an auxiliary chamber containing a unique device for lowering the vacuum when tube is too high. When doing so the anode wire is disconnected and hooked into the small ring on accessory chamber.

This tube is also furnished with Vacuum Regulation on the Osmosis principle at the same prices.

PRICE LIST.

Code NESLE	10 in. spark.....	\$20.00
" NESTO	12 " "	22.50
" NETRA	14 " "	25.00
" NETTU	16 " "	27.50
" NEUSE	20 " "	30.00

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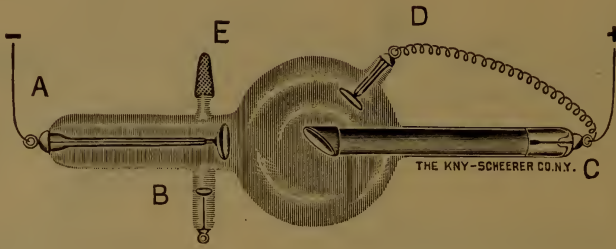


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G/5840

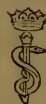
G/5840 The "Gundlach" X-Ray Focus Tube, with Vacuum Regulation on the Osmosis Principle.

It is known as the "Heavy Target Tube," and has been on the market for many years. The excellent results which it has given have created a large demand for it. Whenever the vacuum in the tube becomes too high the platinum wire sealed into the accessory glass tip is to be heated by an alcohol flame. The platinum wire becoming porous when heated will pass a small amount of gas into the bulb thus lowering the vacuum to a degree as may be desired.

Following we give the sizes which we are prepared to offer:

Code NIDDA	Diam. of bulb $4\frac{1}{2}$ in., spark 6 to 8 in.....	\$15.00
" NIEMA	" " " 5 " " 8 to 12 ".....	17.00
" NIERE	" " " $5\frac{1}{2}$ " " 12 to 16 ".....	19.00
" NIGDE	" " " 6 " " 20 in.	21.25
" NIGRA	" " " $6\frac{1}{4}$ " " 24 ".....	23.75
" NIHIL	" " " $6\frac{1}{2}$ " " 28 ".....	25.50

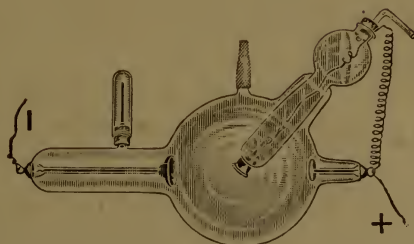
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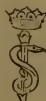
G/5845

G/5845 The Gundlach X-Ray Focus Tube, with Water-Cooled Anode and Vacuum Regulator on the Osmosis Principle.

The water cooling chamber being in direct contact with the anti-cathode, prevents overheating, and makes this type of X-Ray tube especially well adapted for long exposures and therapeutic purposes. A heavy piece of wire of pure nickel metal is connected with the platinum vessel, and serves as heat conductor kept constantly cool by surrounding water. Care must be taken that the tube is only used when cooling chamber is filled with water.

Code NIMBU	Bulb of tube 6½ to 7 in. diam.....	\$40.00
" NIMES	" " " 8 in. diam.....	50.00

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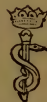
G/5847

G/5847 Müller's X-Ray Tube, plain form, without attachment for regulating the vacuum. The rays emanate from a sharp point of the anode, which latter is surrounded by a rim in order to concentrate the rays. As with all *Müller-Tubes* the central part of the bulb is blown especially thin, so as to offer the least resistance to the passing of the rays. It is therefore recommended to place *Müller-Tubes* when in use in such a manner, that the axle of the tube, (**not** the plate of the anode) is situated parallel to the photographic plate or the screen used.

These tubes are especially adapted for treatment. Note the exact division of the two spheres. Superior to ordinary tubes in lasting qualities. With the increase in the size of these tubes the weight of the anode and mountings are increased accordingly, so that the tubes are more durable and will stand considerable more pressure.

Code NIMP	Diameter of bulb, 5 in; spark length, 4 to 8 in.				Price	
" NIMRO	"	"	"	5½ "	"	\$10.50
" NIMME	"	"	"	5¾ "	"	15.00
" NINA	"	"	"	6½ "	"	18.00
					"	22.50

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G/5848

U. S. Patent, Sept. 27th, 1904.

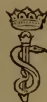
G/5848 Müller's X-Ray Tubes, plain form, but provided with *Müller-Vacuum-Regulation* for either raising or lowering the vacuum and keeping it *automatically* at the point desired. In most instances the vacuum will have to be lowered, as the vacuum in all tubes has a tendency to become too high as a consequence of continual use. The vacuum should be raised only in case too much pressure has been put onto the tube or if the vacuum has been lowered too much.

By placing the adjusting wire at a certain distance (1—5 in.) from the cathode the same degree of the vacuum can be maintained at any point desired by the automatic working of the *Müller-Regulation*.

In case high or low vacuum rays should be desired alternately, it is strongly recommended to use two tubes of different vacua.

Code NINGA	Diameter of bulb, $5\frac{1}{4}$ in ; spark length, 6 to 10 in.	Price.....	\$18.00
" NINO	" " " $5\frac{3}{4}$ " " " 8 to 14 "	"	22.50
" NIOBE	" " " $6\frac{1}{2}$ " " " 8 to 20 "	"	27.00
" NIPA	Extra heavy " $6\frac{1}{2}$ " " " 8 to 20 "	"	30.00

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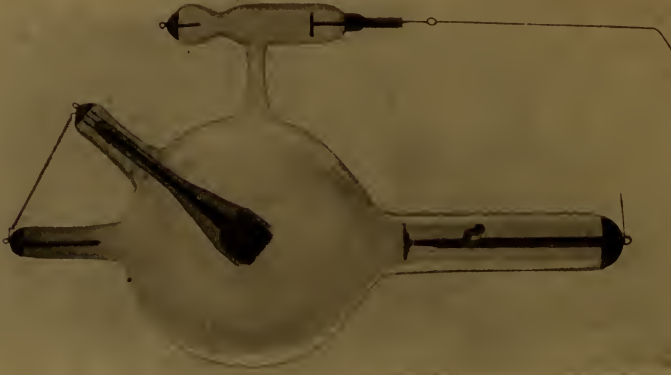


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G/5852

U. S. Patent, Sept. 27th, 1904.

G/5849 Müller's X-Ray Tube, with patented Vacuum Regulator.

Code NIPPO

The anode of this tube is constructed especially strong and heavy. It is surrounded by a metal mantle, the latter serving as a good conductor for carrying off the heat. It is especially well adapted to strong currents, will stand a great amount of pressure and is preferred for its durability.

The diameter of bulb is 6 in. Spark length 10 to 20 in.

Price \$27.50

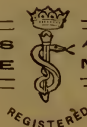
G/5852 Müller's X-Ray Tube, same as described above except that the anode

Code NISSE

is encased in a glass mantle which cuts out the secondary rays. This improvement is much appreciated by the profession, and has been highly recommended because of the most satisfactory results obtained by it.

Price 33.00

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G/5856

U. S. Patent, Sept. 27th, 1904.

G/5856 Müller's Water-Cooled X-Ray Tube, with patented Vacuum Regulator.

This tube is especially well adapted for extended use and for strong currents. It may be kept running for hours without interruption, and without impairing its usefulness in the least.

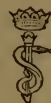
The anode consists of a platinum vessel which is to be filled with water and being in direct contact with the cooling fluid the temperature of the metal anode can never rise above the boiling point of the latter. The anode will never glow and impair the life of the tube.

Attention should be paid to the fact that the tube must **never** be used without the vessel being previously filled with water, as it would otherwise be ruined immediately.

As this tube is practically indestructible it is the most economic in use, notwithstanding its seemingly high price.

Code NIZZA	Diameter of bulb, 7 in; length of spark, 8 to 20 in.	Price.....	\$52.50
" NOBBA	" " " 8 " " " " 8 to 20 "	"	64.00

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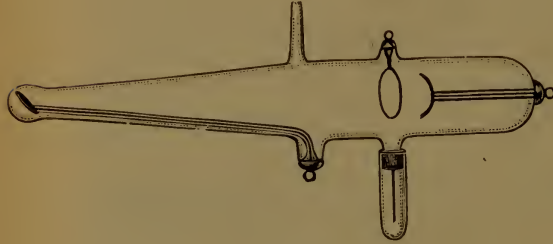


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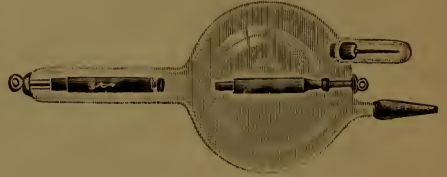
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G/5870



G/5890

G/5870 Müller-Uri's X-Ray Tube for treatment purposes. The cathode is supported on a long stem; the anode, which is an aluminum ring, is placed opposite. Within the globular end of the conical shaped tube is placed the secondary anode (reflector). The rays from this reflector act only upon an area of surface equal to a 25 cent piece.

Price \$25.00

G/5873 Caldwell's Therapeutic X-Ray Tube with Water Jacket..... 12.50
Code NOMBU

G/5874 Caldwell's Therapeutic X-Ray Tube with Water Jacket and Platinum Target..... 14.00
Code NOMIO

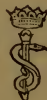
G/5878 Monell's Tube for Static Machine..... 8.00
Code NONPA

G/5883 Tousey's Tube for Treatment..... 15.00
Code NOPPE

G/5890 Valve Tube. Valve tubes when properly used and correctly connected in series with the X-Ray focus tube will protect the latter against the harmful influence of the current. Especially in cases where electrolytic interrupters are used they are to be highly recommended.

Complete with arrangement for regulating the vacuum. Price 10.00

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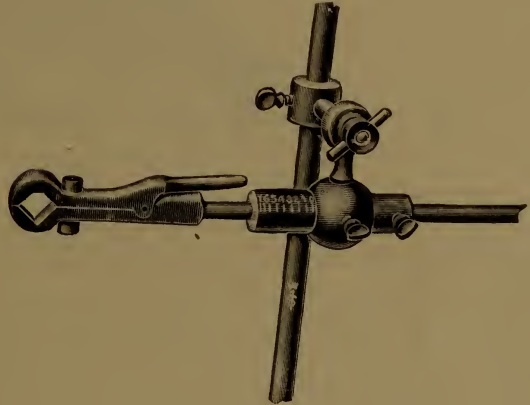
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X-Ray Tube Stands.



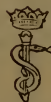
G/5930



G/5934

- | | | |
|---------------|--|----------------|
| i/5930 | Tube Support, with universal movement and wooden clamp. | \$12.00 |
| ode NOWGO | Price..... | |
| i/5934 | Tube Support, with universal movement for regular work and for taking stereoscopic views. The tube holding arm is adjustable and is graduated. Price..... | 15.00 |
| ode NOWIK | | |

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FLUOROSCOPY.

There are several salts which fluoresce under the influence of the X-Rays, but no chemical compound has thus far been found which undergoes this change more satisfactorily than Barium-Platino-Cyanide which was first discovered and used for this purpose by Professor *Roentgen* in his experiments relating to the X-Rays.

Brilliancy of fluorescence depends upon the chemical purity of the preparation. The Platinum Chloride from which the Barium-Platino-Cyanide is made must be chemically pure and especially must it be free from oxides of other metals.

The fluorescing salt in its efficient form is only obtained after repeated processes of crystalization, and can then be applied to a specially prepared heavy paper. It is important that it be applied evenly and in not too thin a layer. The screens of this material which we are offering are guaranteed to be of the best quality and are covered for better protection with a very thin sheet of celluloid and a coat of colorless amylic lacquer.

The Fluoroscope or Kryptoscope is useful for preliminary inspections, and by its aid are determined the most favorable positions of the limbs for fixation during skiagraphic exposure. It permits the careful examination of an extremity while it is turned in various directions and reveals the presence of foreign bodies in thinner portions, in the hand for example, with such accuracy and detail that a skiagraph becomes unnecessary.

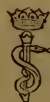
The Fluorescent Screen. For the examination of the larger portions of the body we recommend the purchase of a screen and the standard size of 12 x 16 inches will meet all requirements.

It has been found desirable to limit irradiation as closely as possible to that portion of the body which is under observation, and this would necessitate screens of various sizes in order to meet the different conditions which are involved in work of this character.

As a suggestion of *Dr. Gocht* we are offering a screen of 12 x 16 inches as a standard size which will give a sufficiently large surface for all ordinary work. With this screen we can furnish a set of mats with openings of different sizes. These mats can be attached to the frame which holds the screen and will cut off diffused rays. It is desirable that the screens be kept in a dark room or a covered box and be carefully protected from moisture.

Examinations by means of a screen offer many advantages, for by this means the irradiated portion can be examined while it is performing its function. The movements of the joints, the larynx, the hyoid bone, the lungs, the diaphragm, and even the pulsations of the heart can thus be accurately recorded.

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G/5945

G/5945 Fluoroscope or Kryptoscope, with detachable fluorescent Barium-Platino-Cyanide Screen. Wooden Casing lined with black canvas,

Code NUBA	Size 5 x 7 inches screen.....	\$10.00
Code NUCIF	“ 6 x 8 “	13.50
Code NUEVO	“ 7 x 9 “	16.50
Code NUFLI	“ 8 x 10 “	22.50

G/5951 Fluorescent Screens of Barium-Platino-Cyanide, mounted on black wooden frame,

Code NULLO	Size 5 x 7 inches	7.50
Code NUMER	“ 6 x 8 “	10.50
Code NUMMU	“ 7 x 9 “	13.50
Code NUMKA	“ 8 x 10 “	18.50



G/5953

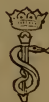
G/5953 Fluorescent Screen of Barium-Platino-Cyanide, *Dr. Gocht's* with a set of card board mats.

Code NUORO	Standard size 12 x 16 in.....	40.00
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For **Intensifying Screens** of Tungstate of Calcium see photographic supplies.

N. B.-- Please note that our Fluorescent screens are guaranteed to be of absolutely the best quality. When ordering our goods indirectly pay attention to our guarantee stamp being impressed into the frame.

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Rheostats.

In order to reduce the pressure of a commercial electric current it is necessary to interpose resistances in its path, which are known as Rheostats.

We manufacture a variety of patterns but are limiting our quotations in this catalogue to a small assortment suitable for X-Ray Apparatus.



G/5970

G/5970 Rheostat for Coils of 14" spark or over, consisting of a venetian finished slate base in back of which resistance coils, of standard wire, are enclosed in a steel box with perforated metal sides, so as to allow the generated heat to escape. The board is furnished with a snap switch, two multiple contact switches for resistances of full ohms and tenths of ohms. A semi-exposed fuse is also furnished to guard against overload.

Code PAABE
Code PAALO

For 110 volts direct current or 104 volts alternating, Price	\$40.00
" 220 " " "	45.00



G/5974

G/5974 Rheostat, cheaper type,
suitable for coils of less than
14 in. spark, with coarse adjustment.

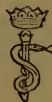
Code PAAR For 110 volts direct current,
or 104 volts alternating.

Price..... \$20.00

Code PACHY For 220 volts direct current.

Price..... 22.50

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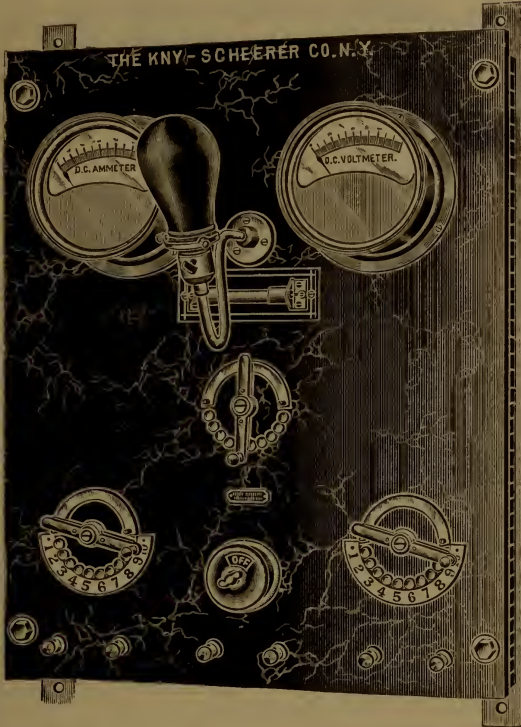


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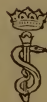
Telegraphic Address: EXRAY-NEW-YORK.



G/5977

G/5977 Combination Wall Switch Board, on slate base marbled with Volt and Ampère-Meters, Ruby Lamp and shade of special design, speed controller with multiple point contact switch for motor of Mercury Turbine Interrupter, Rheostat for primary of coil with switches for full and one tenth ohm resistance, semi-exposed fuse and snap switch. Resistance is of a standard wire and enclosed in metal box with sides of perforated metal to avoid overheating. Price **\$120.00**

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G/5980

G/5980 Portable Switch Board Table for direct current of 110 or 220 volts.
Code PADUA

In order that the practising physician may regulate the conditions of the current without being compelled to change his position towards the apparatus proper or the patient, we have placed upon the market a Switch Board Table which is mounted on easily rolling casters. The table is constructed of steel, in the interior are mounted the spiral resistances of metal. The table is encased by perforated metal sheeting for the purpose of protection and for carrying off the heat generated by the resistance when in use.

On the top of the table is placed a marble slab upon which are mounted:

1 Ampère Meter 0 to 20 ampères, two multiple point contact switches for resistances of full ohms and tenths of ohms, also snap switches. Price

\$85.00

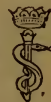
G/5981 Portable Switch Board Table for direct current of 110 or 220 volts.
Code PAELI

Construction of this table in a general way is exactly like Fig. G/5980 except that a *Wehnelt's* electrolytic interrupter is added and placed inside of table frame. In this way the method of conducting and regulating the current is very much simplified, being limited to a cable from the table to the switch board and from the switch board to the induction coil.

The top of table consists of a marble or slate slab upon which are mounted a multiple point resistance regulator, a double pole switch, Ampère Meter of from 0-40 ampères and a ruby color incandescent globe. Price.....

110.00

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Direct Current Motor Generators for X-Ray Coils.

When it is only possible to obtain a commercial current at 500-volts pressure, the voltage may be transformed by a motor generator of appropriate output, see table below. For induction coils of 10 and 12 in. spark length, we recommend Motor Generator No. 1; for 14 and 16 in. spark length, Motor Generator No. 2; for 18 and 20 in. spark length, Motor Generator No. 3.



G/6000/02

G/6000 No. 1. Motor Side 500-V. D. C., Generator Side 420 Watts output D. C.... **\$200.00**

Code PAITA

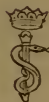
G/6001 No. 2. Motor Side 500-V. D. C., Generator Side 1300 Watts output D. C.... **300.00**

Code PAION

G/6002 No. 3. Motor Side 500-V. D. C., Generator Side 2250 Watts output D. C.... **400.00**

Code PAKHO

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Telegraphic Address: EXRAY-NEW-YORK.

Alternating Current Motor-Generators.

In cases where the only available source of current supply is an alternating electric light circuit and whenever the initial cost is not first consideration with purchaser, a motor-generator may be recommended as a most perfect and economical way.

The apparatus will answer the purpose admirably in generating a steady uni-directional current. It has to be carefully erected, preferably in the basement of the house and must be placed upon a solid foundation, so as to avoid vibration.

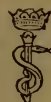
When ordering these Motor-Generators please specify the voltage and frequency of the alternating current circuit for which they are to be used.



G/6010/15

Cat No.	Code	Commercial Current	Horse Power	Output 110 Volts D. C.	Price
G/6010	PALFY	60 cycles	2	10 Ampères	\$320.00
G/6011	PALLA	do.	3	15 "	400.00
G/6012	PALO	do.	4	20 "	475.00
G/6013	PALUD	125 cycles	2	10 "	420.00
G/6014	PALZY	do.	3½	15 "	500.00
G/6015	PAME	do.	5	20 "	600.00

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Electrolytic Rectifiers.

Several forms of electrolytic rectifiers have of late attracted much attention on account of their simplicity, their high efficiency and their moderate price.

A Rectifier transforms alternating current into continuous current quite independent of periodicity and — up to a certain extent — of pressure. As far as the application of the types of apparatus for medical purposes are concerned they represent undoubtedly the solution of a most important practical problem.

We are not prepared to describe in this present issue the latest forms of rectifiers which we have now under construction but shall be glad to furnish in due time details and quotations on the subject to interested parties.

Accumulators or Storage Batteries.

Accumulators or Secondary Cells obtain their effect by reason of the polarizing action of oxygen and hydrogen. The two dissimilar electrodes consist of two dissimilar oxides of lead, the positive lead plates are provided with grooves, the negative plates are cross barred. If a current is passed through, oxygen is generated at the positive plate, causing the formation of peroxide of lead which may be recognized as a reddish brown deposit on the plate. The negative plate, meanwhile, becomes coated with sulphate of lead by the action of the sulphuric acid in which both plates are immersed.

When charging storage batteries the sulphuric acid solution becomes more and more concentrated, the saturation point of charging is marked by the evolution of hydrogen and oxygen at the cathode and anode respectively, which proves that the electric current is no longer able to induce chemical action upon the plates.

The Accumulator is now fully charged. The passage of the electrical current has effected chemical change in the plates and by connecting the latter externally by means of a conductor an electrical current is produced in the opposite direction to the charging current which continues until the stored amount of current in the plates is discharged.

Accumulators furnish a supply of powerful current at a steady pressure of two volts per cell, the capacity is expressed in ampère hours — i. e. the number of hours for which the accumulator can be discharged with the current of 1 ampère.

For portable use storage batteries are put up in sealed rubber jars, enclosed in neat hardwood cases, provided with handles and binding posts. Unless otherwise ordered, portable batteries will be shipped filled with electrolyte, and charged ready for service. While the greatest care is used in packing, it is almost impossible to avoid damage to cells of this type when shipped by freight; for short distances it is therefore recommended to ship by express, where packages receive more care in handling. Where this method is too expensive it is advised to forward without electrolyte, which may be ordered to be shipped in a separate vessel, for which a small extra charge is made.

The normal rate is the highest rate in ampères at which the battery should be charged. At this rate the battery will be fully charged in nine hours and discharged in eight hours. At less than normal rates the length of time is increased in both instances and in discharging at more than the normal rates the time is decreased.

Each cell gives approximately two volts, and, as all the cells in a case are connected together in series, the number of cells multiplied by two will give the approximate voltage between the two binding posts attached to each case.

Two sets of our G/6052 or 6053 will be suitable for operating the smaller sizes of induction coils for therapeutic purposes, but for the larger coils we recommend two sets of G/6054.

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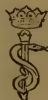
G/6050/54

Catalogue	Code	No. of Cells in case	Normal charge and Discharge Rate Amperes	Dimensions of case	Weight complete	Price complete charged
G/6050	PANTA	1	10	$4\frac{1}{4} \times 10 \times 14\frac{1}{4}$ in.	33 $\frac{1}{2}$ lbs.	\$14.50
G/6051	PANZE	2	10	$7\frac{5}{8} \times 10 \times 14\frac{1}{4}$ "	60 "	28.00
G/6052	PAOLA	3	10	$10\frac{1}{2} \times 10 \times 14\frac{1}{4}$ "	86 $\frac{3}{4}$ "	40.00
G/6053	PAONY	4	10	$13\frac{5}{8} \times 10 \times 14\frac{1}{4}$ "	113 $\frac{1}{4}$ "	50.00
G/6054	PAPAL	5	10	$16\frac{3}{4} \times 10 \times 14\frac{1}{4}$ "	140 "	60.00

Portable X-Ray Outfit with Gasoline Motor Generators.

Very often it is found impractical or impossible to obtain commercial electric service in many localities, and to meet this condition, we have devised outfits such as shown in the illustration; comprising a gasoline engine directly connected to a slow speed multi-polar dynamo, and cabinet equipped with a complete X-Ray set, consisting of our standard sectional wound induction coil, centrifugal mercury jet interrupter, high tension magnetic interrupter, standard volt meter and ammeter, inverse current controller, primary controller,

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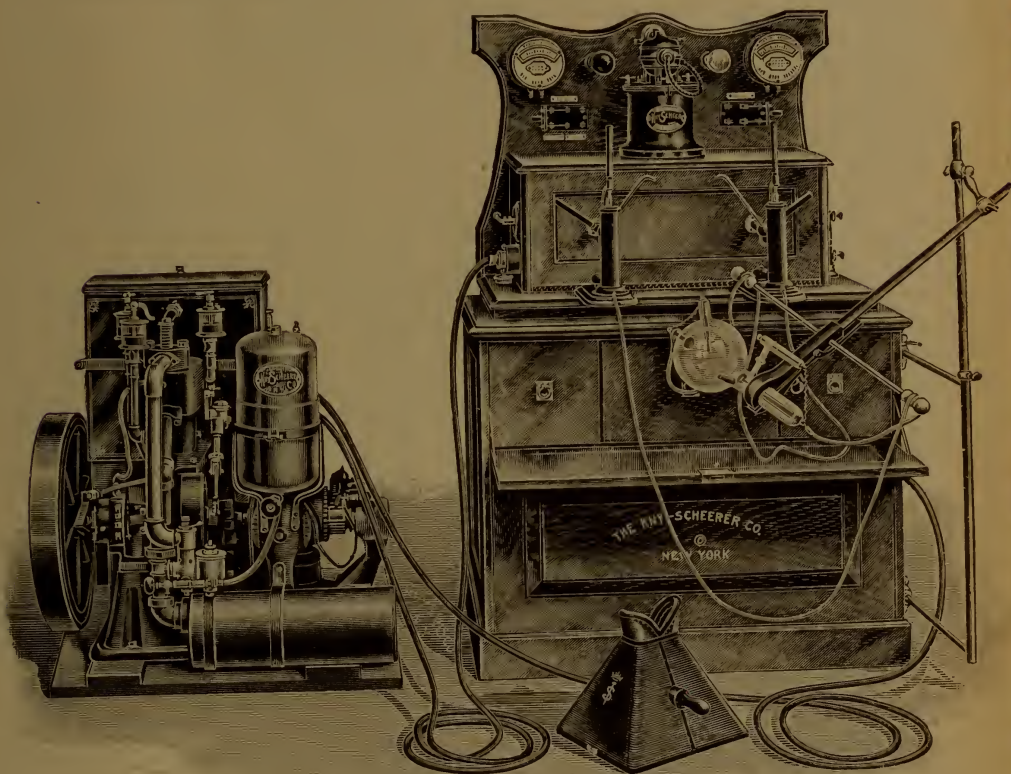
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pole changing interrupter switches, adjustable tube holder, tubes, cords and fluoroscope. The articles enumerated are the same as furnished with our regular hospital equipment and are of the very best mechanical and scientific construction; none but perfect material entering into the production of same, under the most careful supervision.



G/6090

The engine is very simple and substantial in construction, and starts without the difficulty usually experienced with gasoline motors. It is very economical in operation, consuming one quart of gasoline per hour.

G/6090 The illustration shows our 14 in. outfit operated by a 1 kilowatt generator and connected thereto by means of flexible cables. This outfit will give a heavy continuous high frequency discharge of 14 in.
Code PAPIA

The current output of the particular generator set shown in the illustration is 10 ampères at 110 volts E. M. F., and may be used for a variety of purposes, such as lighting, charging of storage batteries, operation of galvanic, furadic and cautery apparatus.

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PORTABILITY.

The X-Ray cabinet is so constructed, that the entire mechanism may be placed within the case, including tubes, and fluoroscope and the tube holder folded close to the side, as shown in the illustration and then set within a substantially constructed shipping case.

The engine being self-contained is packed in the same manner, and may be readily transported and set up, it merely being necessary to bolt the engine to a firm foundation before starting.

Prices of outfits of various capacities will be furnished upon application. Specify the length of spark required, and if the generator is to be used for any other purpose than X-Ray work, state what for, and whether gas or gasoline is to be used.

COMPLETE X-RAY OUTFITS.

As a rule we complete X-Ray equipments upon receipt of order. The various component parts of an outfit are constantly on hand and it requires but a very short time to assemble and mount them in accordance with special wishes expressed by our clients.

The induction coil can be placed upon stationary or portable cabinets or may be mounted upon substantial wall brackets. The interrupters sometimes are placed inside of the cabinet or they may be placed on top of it. Electrolytic interrupters are often given a place in an adjoining room.

It will afford us pleasure to consider special wishes which our customers may express regarding such equipments and carry them out so far as possible.

Following we specify some standard types of X-Ray outfits which may be ordered by catalogue numbers or by their respective "code word" if order is sent by telegram.

G/6100 Standard Type X-Ray Outfit No. 1.

Consisting of—

- 1 K.-S. Co.'s Induction Coil—8 inches Spark—Type B.
- 1 Cabinet, quartered oak, highly finished.
- 1 K.-S. Co.'s Patented *Wehnelt* Electrolytic Interrupter with water cooling jacket.
- 1 Pole Changing Switch.
- 1 K.-S. Co.'s Rheostat.
- 1 K.-S. Co.'s Plain Focus tube, 3 Electrode Pattern.
- 1 Fluoroscope, Platino-Barium-Cyanide, with detachable screen 8 x 10 inches.
- 1 Adjustable Floor Tube Stand.
- 1 Set of Cords for connecting tube.

Code PAPRI	For Direct Current 110 or 220 Volts.....	\$280.00
Code PARAD	For Alternating Current 104 to 120 Volts.....	290.00

G/6101 Standard Type X-Ray Outfit No. 2.

Consisting of—

- 1 K.-S. Co.'s Induction Coil—10 inches Spark—Type B
- Accessories as described under G/6100.

Code PARDO	For Direct Current of 110 or 120 Volts.....	310.00
Code PAREY	For Alternating Current of 110 to 120 Volts leader	320.00

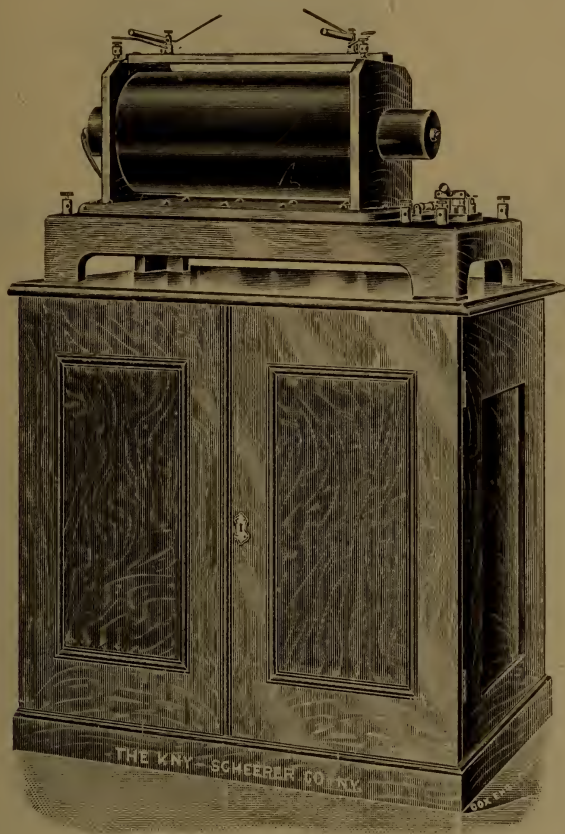
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G/6100/6103

THE KNY-SCHEERER COMPANY'S X-RAY EQUIPMENT, "STANDARD TYPE."

G/6102 Standard Type X-Ray Outfit No. 3.

Consisting of—

1 K.-S. Co.'s Induction Coil—12 inches Spark—Type B.

Accessories as described under G/6100.

Code PARFO	For Direct Current of 110 or 220 Volts.....	\$350.00
Code PARGA	For Alternating Current of 104 to 120 Volts.....	360.00

G/6103 Standard Type X-Ray Outfit No. 4.

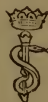
Consisting of—

1 K.-S. Co.'s Induction Coil—14 inches Spark—Type B.

Accessories as described under G/6100.

Code PARID	For Direct Current of 110 or 220 Volts.....	400.00
Code PARKA	For Alternating Current of 104 to 120 Volts.....	410.00

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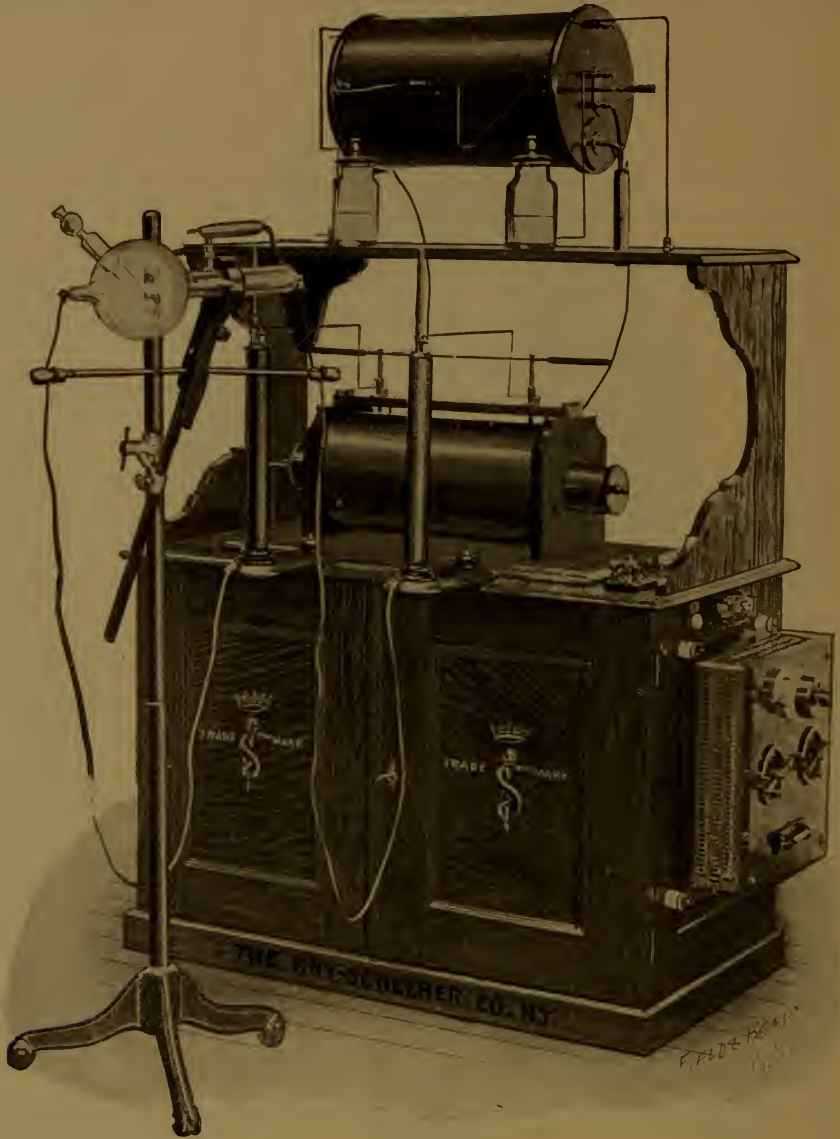


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G/6110/6114

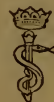
THE KNY-SCHEERER COMPANY'S X-RAY EQUIPMENT "PERFECTION TYPE."

To medical practitioners desirous of combining with their radiographic and radiotherapeutic work the use of *Oudin's* apparatus for the treatment with high frequency currents we recommend our **Perfection Type X-Ray Equipment with High Frequency Current Apparatus.**

With a suitable set of Electrodes this attachment gives better results than can be obtained with the troublesome and rather unreliable static machine.

Following we are quoting an assortment of various complete outfits of apparatus and for the convenience of our friends we give prices for complete equipments inclusive and exclusive of the high frequency attachments.

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G/6110 Perfection Type X-Ray Outfit No. 8.

Consisting of —

- 1 K.-S. Co.'s Induction Coil — 12 inches spark — Type B.
- 1 Cabinet of quartered oak with concealed wiring.
- 1 Compound Rheostat with snap switch.
- 1 Semi-exposed Fuse.
- 1 Set of Multiple Spark Gaps.
- 1 Pole Changing Switch, mounted on top of cabinet.
- 2 K.-S. Co.'s Patented *Wehnelt* Electrolytic Interrupters.
- 2 Water-Cooling Jackets for same.
- 1 Double Throw, Double Pole Switch for placing either interrupter into series (mounted on side of cabinet).
- 1 Fuse Block to connect with main circuit.
- 1 Adjustable Floor Tube Stand.
- 2 K.-S. Co.'s Adjustable Vacuum Focus Tubes. Heavy pattern of latest design.
- 1 Fluoroscope with detachable screen, Platino-Barium-Cyanide, 8 x 10 in.
- 1 Set of Insulated Cables for connections.

The High Frequency Current Attachment.

Consists of —

- 1 Solenoid, K.-S. Co.'s Special Type, all enclosed in hard rubber.
- 1 Set of two *Leyden* Jars.
- 1 Ball Electrode.
- 1 Set of three assorted Vacuum Electrodes.
- 1 Universal Handle for same.
- 1 Insulated Cord with snap hook.

PRICES.

Complete Equipment including High Frequency Current Apparatus.

Code PARMA	For 110 or 220 Volts direct current.....	\$450.00
Code PAROD	“ 104 to 120 “ alternating current.....	470.00

Equipment without High Frequency Apparatus.

Code PARRY	For 110 or 220 Volts direct current.....	390.00
Code PARSI	“ 104 to 120 “ alternating current.....	410.00

G/6111 Perfection Type X-Ray Outfit No. 9.

Consisting of —

- 1 K.-S. Co.'s Induction Coil—14 inches Spark—Type B, mounted in the same manner as described under G/6110 and equipped completely as specified under this number.

PRICES.

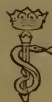
Complete Equipment including High Frequency Current Apparatus.

Code PARTE	For 110 or 220 Volts direct current.....	500.00
Code PARWA	“ 104 to 120 “ alternating current	520.00

Equipment without High Frequency Current Apparatus.

Code PASAR	For 110 or 220 Volts direct current.....	440.00
Code PASCO	“ 104 to 120 “ alternating current	460.00

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Telegraphic Address: EXRAY-NEW-YORK.

G/6112 Perfection Type X-Ray Outfit No. 10.

Consisting of —

- 1 K.-S. Co.'s Induction Coil—16 inches Spark—Type B, mounted in the same manner as described under G/6110 and equipped completely as specified under this number.

PRICES.

Complete Equipment including High Frequency Current Apparatus.

Code PASIP	For 110 or 220 Volts direct current	\$540.00
Code PASSA	" 104 to 120 " alternating current	560.00

Equipment without High Frequency Current Apparatus.

Code PASTY	For 110 or 220 Volts direct current	480.00
Code PATA	" 104 to 110 " alternating current	500.00

G 6113 Perfection Type X-Ray Outfit No. 11.

Consisting of —

- 1 K.-S. Co.'s Induction Coil—18 inches Spark—Type B, mounted in the same manner as described under G/6110 and equipped completely as specified under this number.

PRICES.

Complete Equipment with High Frequency Current Apparatus.

Code PATAY	For 110 or 220 Volts direct current.....	600.00
Code PATNA	" 104 to 120 " alternating current	620.00

Equipment without High Frequency Current Apparatus.

Code PATOW	For 110 or 220 Volts direct current	540.00
Code PATRI	" 104 to 120 " alternating current.....	560.00

G 6114 Perfection Type X-Ray Outfit No. 12.

Consisting of —

- 1 K.-S. Co.'s Induction Coil—20 inches Spark—Type B, mounted in the same manner as described under G/6110 and equipped completely as specified under this number.

PRICES.

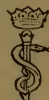
Complete Equipment including High Frequency Current Apparatus.

Code PATTa	For 110 or 220 Volts direct current.....	650.00
Code PAUKE	" 104 to 120 " alternating current	670.00

Equipment without High Frequency Current Apparatus.

Code PAUL	For 110 or 220 Volts direct current.....	590.00
Code PAVET	" 104 to 120 " alternating current.....	610.00

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High Frequency Current Apparatus.

For a detailed description of High Frequency Current Apparatus, their application and method of treatment we refer to that part of this Catalogue especially devoted to this subject (see G/6602 to 6798.)

The electrodes illustrated and quoted below are of a simple and cheap construction. The better and more efficient patterns are quoted under G/6700 to 6798.

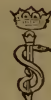
Vacuum Electrodes for High Frequency Currents.



G/6140. A to H.

A	Vaginal	each	\$1.00	E	Urethral	each	\$1.00
B	Rectal	"	1.00	F	Intra Uterine	"	1.00
C	Surface	"	1.00	G	Handle to fit vacuum electrodes	"	1.25
D	Surface, plain	"	0.90	H	Metal Ball with handle	"	1.50

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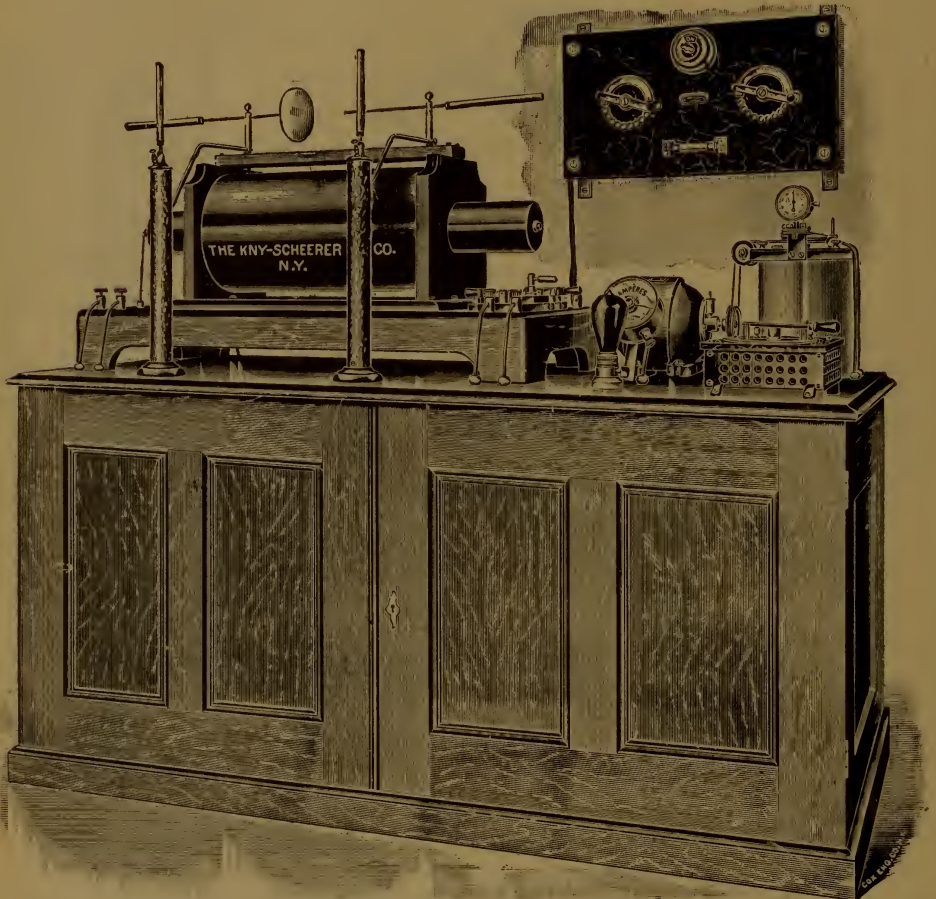
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SPECIAL X-RAY OUTFITS.

As already stated, we shall be pleased to carry out special designs in the construction of X-Ray Equipments whenever plans and specifications are submitted to us in a comprehensive form. We shall be pleased to receive correspondence from our friends on the subject and shall give desired information and advice.

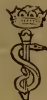
The following illustrations represent some special apparatus supplied by us for the U. S. Government.



SPECIAL X-RAY OUTFIT, MADE FOR THE U. S. ARMY GENERAL HOSPITAL, WASHINGTON, D. C.

DESIGNED BY MAJOR-GENERAL W. C. BORDEN, U. S. A.

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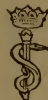
Telegraphic Address: EXRAY—NEW—YORK.

Special X-Ray Outfit, made for the U. S. Army General Hospital, Washington, D. C.
Designed by Major-General *W. C. Borden*, U. S. A.

Consisting of —

- 1 K.-S. Co.'s Induction Coil, 16 in. Spark.
- 1 " Mercury Turbine Interrupter.
- 1 " Motor and Speed Controller for the same.
- 1 Ampère Meter.
- 1 Ruby Lamp.
- 1 Condensor, mica insulated.
- 1 Multiple Point Condensor Switch.
- 1 Pole Changing Switch.
- 1 Semi-Exposed Fuse.
- 1 Selector Switch for Interrupters.
- 1 Set of Two Multiple Point Spark Gaps, mounted on
- 1 Suitable Cabinet, quartered oak finish.
- 1 Compound Wall Rheostat with snap switch.
- 2 *Wehnelt* Electrolytic Interrupters, with water cooling jackets.
- 1 Floor Tube Stand, adjustable.
- 3 X-Ray Focus Tubes of different degrees of hardness.
- 1 Floor Tube Stand.
- 1 Fluoroscope with detachable screen of Platino-Barium Cyanide, 8x10 inches.
- 1 Set of two Heavily Insulated Cords for connecting focus tubes.

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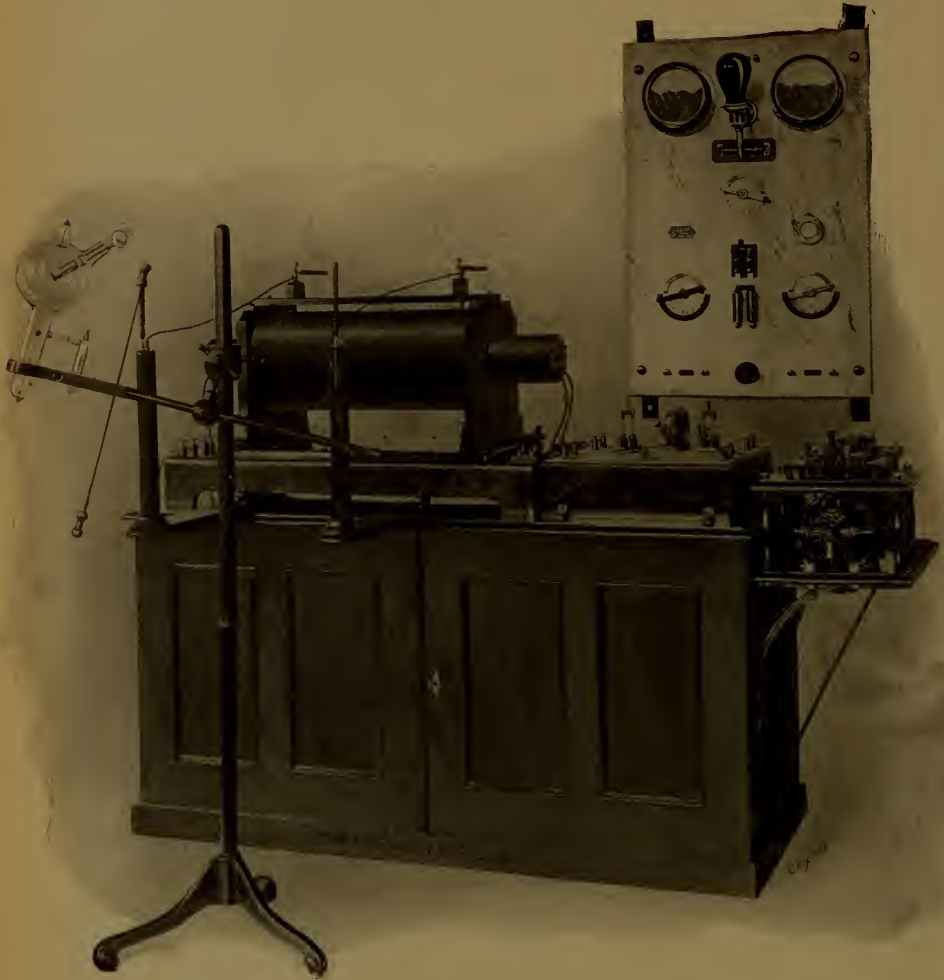


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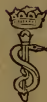
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SPECIAL X-RAY OUTFIT, MADE FOR THE MEDICAL DEPARTMENT, U. S. ARMY.

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THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

Special X-Ray Outfit, made for the Medical Department, U. S. Army.

Consisting of —

- 1 K.-S. Co.'s Induction Coil, 16 in. Spark.
- 1 " Mercury Turbine Interrupter.
- 1 " Motor for the same.
- 1 Magnetic Vibrator Interrupter
- 1 Condensor, mica insulated.
- 1 Multiple Point Condensor Switch.
- 1 Pole Changing Switch.
- 1 Semi-Exposed Fuse.
- 1 Selector Switch for Interrupters.
- 1 Set of two Multiple Point Spark Gaps, mounted on
- 1 Suitable Cabinet, quartered oak finish.

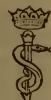
Furthermore —

- 1 Wall Rheostat and Switch Board with
- 1 Ampère Meter.
- 1 Volt Meter.
- 1 Ruby Lamp with Shade of special design.
- 1 Controlling Switch for Rheostat of Motor.
- 1 Second Stop Watch.
- 1 Snap Switch.
- 1 Double Pole Fused Switch.
- 1 Multiple Contact Switch for full ohm resistance.
- 1 " " " " one tenth ohm resistance.

All metal parts finished in brass, lacquered, mounted on slate base, venetian finish.

- 1 *Wehnelt* Electrolytic Interrupter with three platinum points of different sizes.
- 1 Floor Tube Stand, adjustable.
- 6 X-Ray Focus Tubes of different degrees of hardness.
- 1 Fluoroscope with detachable screen of Platino-Barium Cyanide, 8x10 inches.
- 1 Set of two Heavily Insulated Cords for connecting focus tubes.

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SPECIAL X-RAY OUTFIT, MADE FOR THE DEPARTMENT OF MEDICINE AND SURGERY, U. S. NAVY. DESIGNED BY C. F. STOKES, SURGEON, U. S. N.

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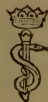
Special X-Ray Outfit, made for the Department of Medicine and Surgery, U. S. Navy.
Designed by *C. F. Stokes*, M. D., Surgeon, U. S. Navy.

Consisting of —

- 1 K.-S. Co.'s Induction Coil, 16 in. Spark.
- 1 " Mercury Turbine Interrupter.
- 1 Motor and Speed Controller for the same.
- 1 Magnetic Vibrator Interrupter.
- 1 Condensor, mica insulated.
- 1 Multiple Point Condensor Switch.
- 1 Semi-Exposed Fuse.
- 1 Pole Changing Switch.
- 1 Combined Volt and Ampère Meter.
- 1 Selector Switch for Interrupters.
- 1 Set of two Multiple Point Spark Gaps, mounted on top of
- 1 Suitable Cabinet, quartered oak finish, mounted on six 4 in. rubber tired wheels.
- 1 *Wehnelt* Electrolytic Interrupter, with three platinum points of different sizes.
- 1 Compound Rheostat.
- 1 Floor Tube Stand, adjustable.
- 3 X-Ray Focus Tubes of different degrees of hardness.
- 1 Fluoroscope with detachable screen of Platino-Barium Cyanide, 8x10 inches.
- 1 Set of two Heavily Insulated Cords for connecting tubes.

N. B.—This Outfit is portable, the cabinet being placed upon a metal frame mounted on strong rubber tired metal casters. In this way the apparatus can be wheeled easily from the X-Ray room into the various wards of the hospital and may be used at the bedside of the patient.

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Examining and Treatment Tables for X-Ray Purposes.

On most occasions when treatment is to be administered it is desirable that the patient should be in the reclining position. The ordinary tables are usually too high and too uncomfortable for this purpose.

It is also desirable that the back and the head should be rather high and be well supported. For these reasons examining tables have been made which should insure a comfortable position for the patient.

Figs. G/6156 to 6159 give a view of a table to which reference has been made. The dimensions are $6\frac{1}{2}$ feet in length by 2 feet in width, and it rests upon four strong legs.

The top is of wood, and when treatment is to be given in which the tube is placed beneath the table, the latter is so arranged that a portion of its wooden top can be removed. A portion of the frame is so adjusted that the head and back of the patient can be elevated above the rest of the body.

Whenever larger sizes of plates must be used they should be placed into a plate holder, for otherwise they would be easily broken.

The table can also be provided with a suitable clamp (as seen in illustration Fig. G/6156 which is so arranged that the plate holder can be placed either under or over the table. In the latter case the *Roentgen* tube must be placed under the table.

Fig. G/6159 represents an up-to-date X-Ray table. It is of the same dimensions as G/6156 and in a general way constructed on the same lines, but has in addition a compression diaphragm of the latest and most improved type.

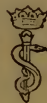


G/6155 Examining Table, simple form, with drop plates at head end and foot end. The table is made of hardwood, 34 in. high, 24 in. wide. When drop plates are extended it measures 6 feet over all. When plates are dropped 40 in.

Code PEKAN

Price.....	\$15.00
Set of cushions for same	5.00

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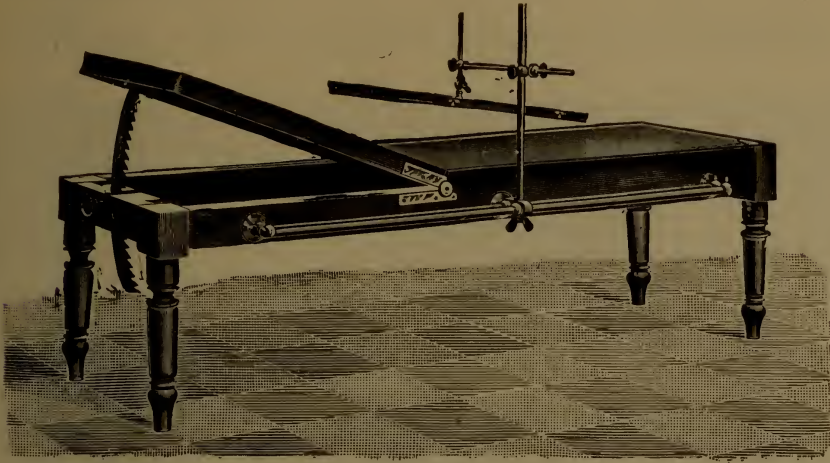


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G/6156

G/6156
Code PELAD

X-Ray Table for Therapeutic and Skiagraphic purposes. Made entirely of wood, it measures 6 ½ feet in length and stands 24 in. high, width 24 in. A metal rod with attachment clamps running on each side of frame serves for clamping on various attachments as plate holders, diaphragms, etc.

Price for table with rail	\$45.00
Price for plate holder (size 12×16 in.) and clamp fittings.....	20.00



THE KNY-SCHEERER CO. N.Y.

G/6159

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G/6159

G/6159 Radiographic and Treatment Table, designed by *C. F. Stokes*, Surgeon U. S. Code PELLY Navy.

This table measures $6\frac{1}{2}$ feet in length, 24 in. in width and stands 24 in. high. It is constructed entirely of wood.

A detachable compression diaphragm of the *Albers Schoenberg's* type with suitable modification for this special purpose is mounted upon two substantial metal sockets capable of sliding back and forth on two metal bars running lengthways on side of table. The diaphragm itself is suspended from a horizontal bar mounted on adjustable bayonet shaped uprights, permitting its application and fixation under pressure over a wide range and in any position. At the foot of the table is a socket for receiving a stool or an accessory table.

Price of table complete with all accessories. \$150.00

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Diaphragms for accurate Radiography and Diagnosis.



G/6225

Showing Application of the *Albers-Schoenberg* Compression Diaphragm.

A marked advance in the *Roentgen* Technique was made by the introduction of diaphragms for the purpose of concentrating upon a limited field the focal rays of the anticathode target and a most excellent instrument of this kind is the *Albers-Schoenberg Compression Diaphragm*.

It excludes the secondary rays emanating from the walls of the X-Ray tube which produce effects of diffused light in skiagraphic work. By its compression levers it permits immobilization of the area to be irradiated, and at the same time brings the object nearer to a photographic plate.

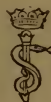
The apparatus consists of an aluminum or brass compression cylinder lined inside with lead, and a metal frame mounted on a solid wooden board. It can be adjusted to horizontal or vertical position. Three lead diaphragms and a tube holder are furnished with each outfit. The compression cylinders can be furnished in sizes of 4 inches or 5 inches diameter.

The *Albers-Schoenberg Compression Diaphragm* has the great advantage that all exposures are taken by it at the same tubal distance from the surface of the body, thus insuring an exact standardization, since the perspective always remains the same.

The four inch compression cylinder furnishes pictures of five inches diameter, and the five inch compression cylinder will give a picture with a diameter of about seven inches.

For stereoscopic views a special compression cylinder is supplied which can also be used for ordinary work. It has a diameter of five inches.

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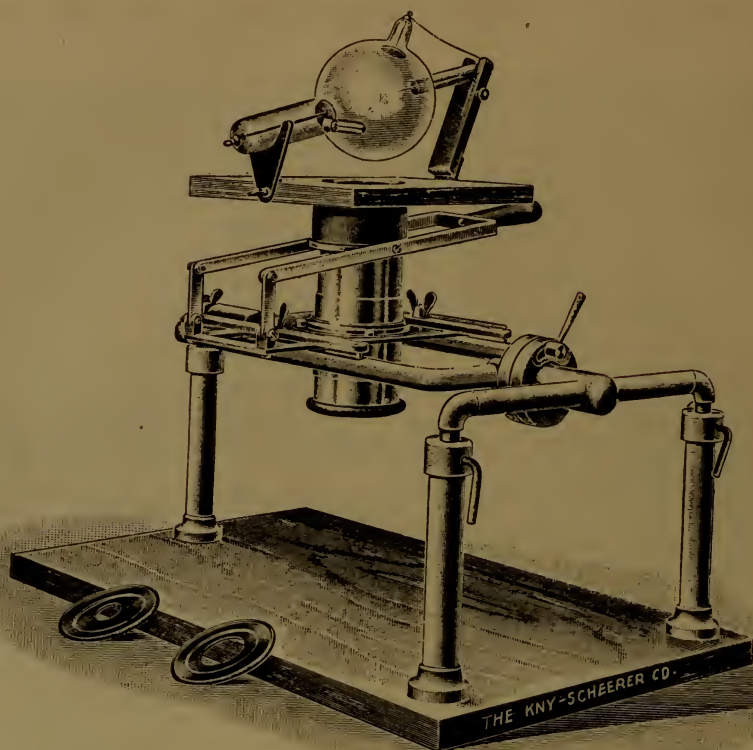


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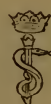
Telegraphic Address: EXRAY-NEW-YORK.



G/6225

- G/6225 Compression Diaphragm**, *Albers-Schoenberg's*, consisting of an adjustable frame on wooden base, with a detachable lead lined compression cylinder of 4 inches diameter, lever arrangement, tube holder and three lead diaphragms, price..... \$120.00
Code PEP0I
- G/6226 Compression Diaphragm**, same as above, but with a compression cylinder 5 inches diameter. Price..... 120.00
Code PEPPI
- G/6227 Compression Diaphragm**, same as above, but with a compression cylinder, 5 in. diameter, for stereoscopic radiography and general work. Price... 130.00
Code PEPRO
- G/6230 Compression Cylinder** only, 4 inches diameter, complete with fittings. Price 45.00
Code PEPUY
- G/6231 Compression Cylinder** only, 5 inches diameter, complete with fittings. Price 45.00
Code PERA
- G/6232 Compression Cylinder** only, for stereoscopic work, 5 inches diameter, complete with fittings. Price..... 55.00
Code PERCA

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Illustrations showing the ALBERS-SCHOENBERG Compression Diaphragm in use.

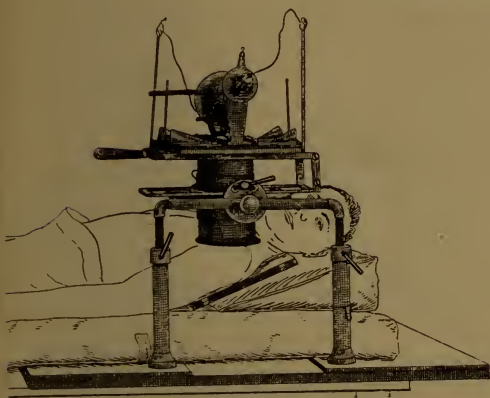


Fig. 1

Fig. 1. Radiographing of shoulder joint.

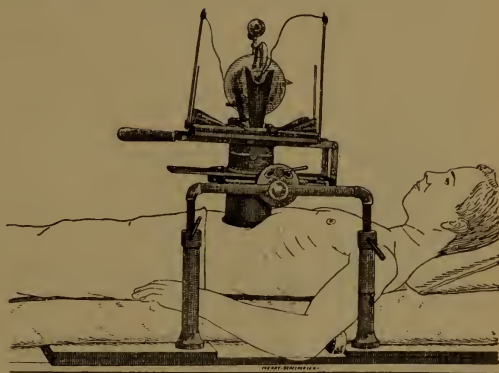


Fig. 2

Fig. 2. " renal calculi. The cylinder is first adjusted vertically, the rim being placed under the lower border of the last rib and liver and pressed down to the limit of comfortable tolerance.

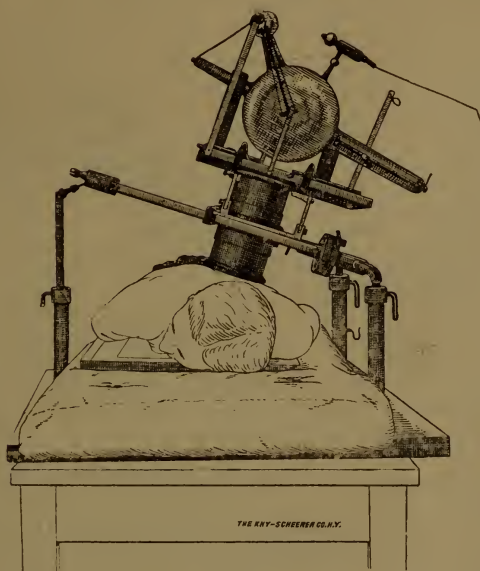
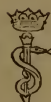


Fig. 3

Fig. 3. Radiographing the shoulder.

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Illustrations showing the ALBERS-SCHOENBERG Compression Diaphragm in use.

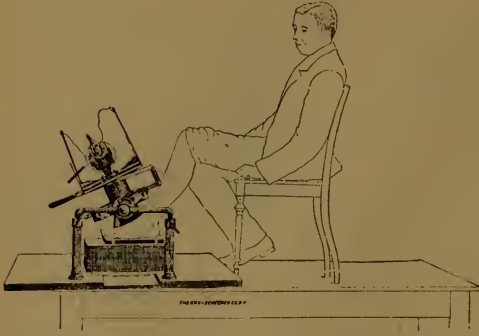


Fig. 4

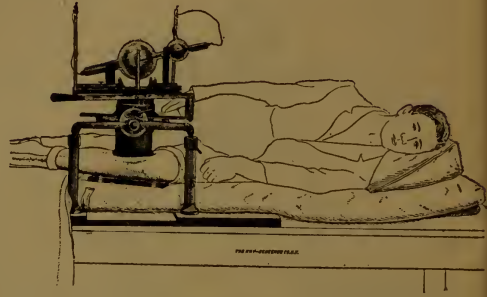


Fig. 5

Fig. 4. Radiographing foot with diaphragm in oblique position. In this exposure the plane of the film cannot be at right angle to the axis of rays, but with thin parts and the tube at 20 inches distance the real error of perspective proves to be negligible in practice.

Fig. 5. Radiographing of knee joint.

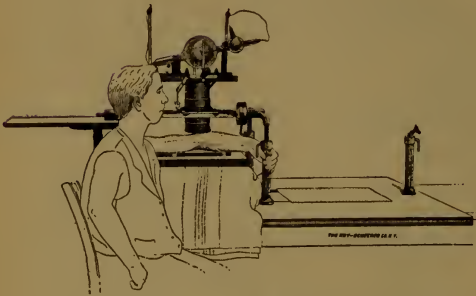


Fig. 6

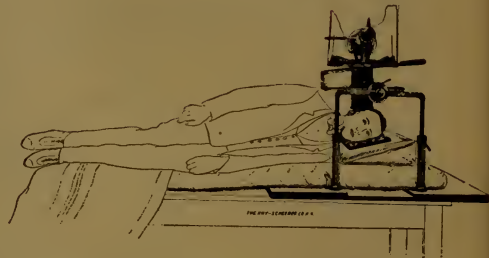


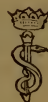
Fig. 7

Fig. 6. Radiographing a single bone of forearm or elbow joint.

Fig. 7. " head in lateral exposure.

The Compression Diaphragm of *Albers-Schoenberg* not only prevents diffusion but also permits immobilization of the area to be irradiated and by compression brings it nearer to the photographic plate. It also offers the advantage of exact standardization as the perspective always remains the same. No *Roentgen* laboratory nowadays can afford to be without such an equipment and the only drawback is a rather high cost which is conditioned by a thoroughly efficient but expensive construction.

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Diaphragms for Accurate Radiography and Diagnosis.—Continued.

A very satisfactory diaphragm answering the purpose of the general practitioner and being considerably less expensive has been designed by *Dr. Carl Beck* of New York.

It prevents diffusion and permits of immobilization, and its cheap price places it within the reach of every physician.



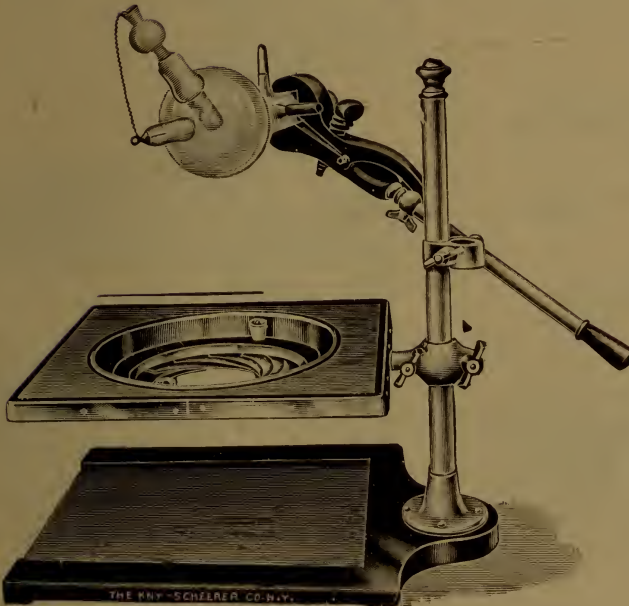
G/6234

G/6234 Tubular Diaphragm, designed by Dr. Carl Beck.

Code PERCY It consists of a set of two nickel-plated brass cylinders with flange on one end. Inside dimensions of the two cylinders are $3\frac{1}{2} \times 8$ in. and $4\frac{1}{4} \times 8$ in.

A clamp to fasten upright standard to table with adjustable socket for carrying the tubular diaphragms.

Price..... \$18.00



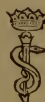
G/6236

G/6236 Iris Diaphragm,

Code PERDE designed by *Des-sauer*, is an excellent apparatus for general use and particularly well suited for skiagraphs of the hip and shoulder joints, also for obtaining fine details in skiagraphic work of the chest. The aperture of the iris diaphragm is easily adjusted, and may either be placed directly upon the surface to be irradiated or at a distance. The base of the apparatus is arranged for receiving dry plates.

Price for complete equipment..... \$45.00

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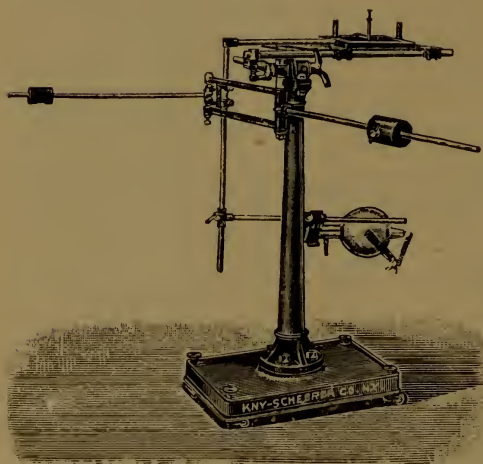
THE ORTHODIAGRAPH.

For correcting magnification and distortion in X-Ray shadows in diagnostic examination with the fluorescent screen.

By this apparatus Scientific Fluoroscopy is made possible just as Scientific Radiography became possible with the invention of the Compression Diaphragm.

As indicated by its name, the object of the orthodiagraph is to produce a correct drawing, with true perspective of object under observation with the fluorescent screen. It enables any physician to take accurate measurements of the heart or any other object in which a shadow may be indicated in pencil sketches. Simplicity and infallible accuracy are its twin merits, it eliminates errors and requires no more skill in its use than should be possessed by any physician of average ability. It will satisfy the requirements of those who are expected to be provided with accurate knowledge concerning the entire bony system, and it reveals unerringly fractures, tumors, cavities, foreign bodies, etc. No consultant on diseases of the heart can afford to be without it as it enables him to quickly trace the exact outline of the heart, either on the skin or on a sheet of paper.

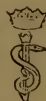
The orthodiagraph is of importance for the localization of foreign bodies of almost every description. It reveals the relations of the bony fragments in a fracture, and with equal accuracy traces the course of a bullet.



G/6242

Orthodiagraph in horizontal position.

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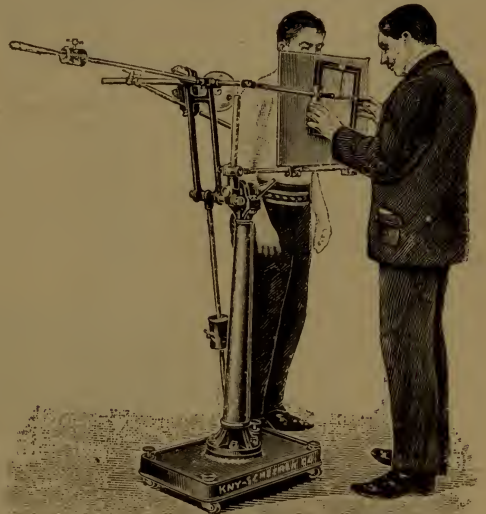
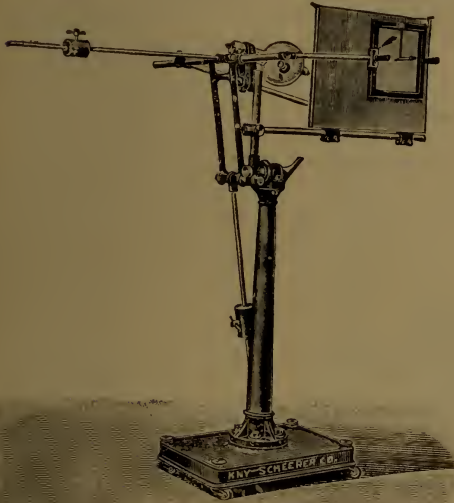
Says Dr. S. H. Monell in the Journal of Treatment for July 1904.

"We can easily ascertain in many cases the distance below the surface of the tissues that a bullet or other object is buried. The method is neat and a long way in advance of some early calculations. First mark out the net size of the object as usual with the tracing pencil, then measure the width of the magnified shadow seen on the screen. The difference between the width of the net tracing and the full shadow is the exact amount of magnification caused by the divergence of the rays at the given distance of tube and object.

With the aid of *Monell's* X-Ray Divergence Chart, the exact depth of a foreign body can be instantly ascertained."

The subject or part which is to be examined is placed between the tube and the fluorescing screen. The bars which carry both pencil and tube are rigidly joined together and move synchronously on ball bearings, so that the slightest movement of the pencil is exactly paralleled by the focus of the vertical rays. The operator guides the pencil around the border of the shadow to be traced. The marking can be made either on the skin or on a sheet of paper clamped in the frame. The pencil point and focus of the tube being fixed in an exact line, and moving simultaneously in all directions (as guided by the hand of the operator) every fraction of a mark made with the pencil is made in the central axis of the rays so that no diverging or distorting ray interferes. The tracing of every shadow is therefore normal and correct in all cases.

Of the various modifications of the original orthodiagraphs we have selected a pattern which with some desirable additions is considered the best in the market.

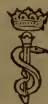


G/6242

Orthodiagraph in vertical position.

G/6242 The MORITZ Orthodiagraph, KNY-SCHEERER Co.'s modification, suitable
Code PERGA for use in horizontal or vertical positions. Price..... \$150.00

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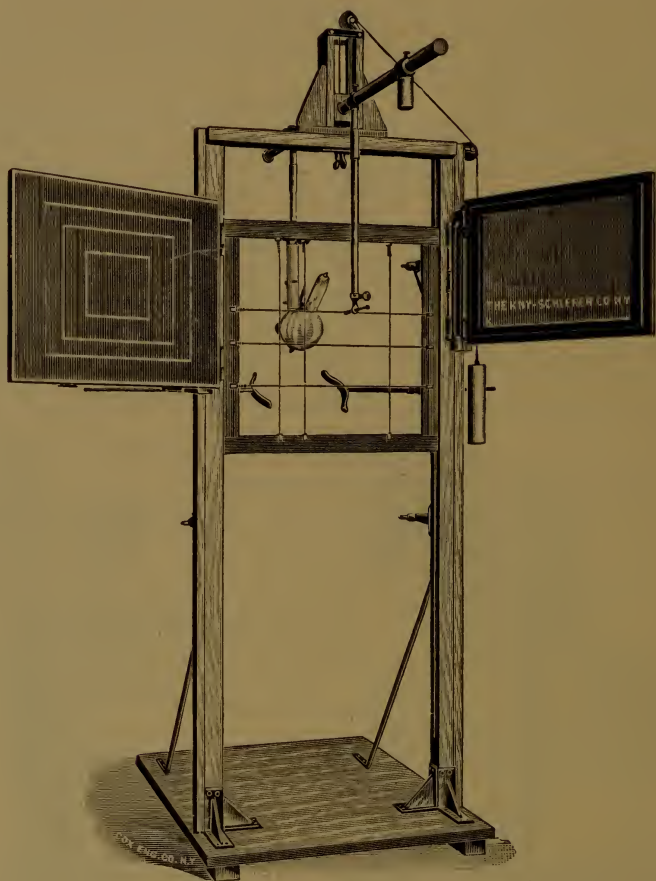


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Hoffmann's Measuring Stand for X-Ray Investigations.

This apparatus is for the purpose of affording measurements relating to the position and size of the organs in the interior of the body, or of foreign bodies which may have found their way there.

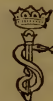


G/6245

In the practical use of this apparatus comparative measurements upon the same individual may be made by means of a scale of numbers, changes in the organs which are to be investigated being indicated by changes in the numerals. The result as to the clinical history may be indicated by from four to eight numbers.

The results of percussion can be directly compared with those which are obtained by radiography.

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The instrument consists of a square frame which can be slid up and down between two vertical posts. The patient whose condition is to be investigated stands upon a platform at the base of the instrument or upon a stool which is placed upon the platform. By this means the instrument may be kept firm and steady. The movable frame has brass sliding bars upon its four sides upon which slide brass riders. Each opposite pair of riders is connected by means of a steel wire 1,5 mm. in thickness.

Three such wires run horizontally across the frame, and three others cross them in a vertical direction.

Scales which are graduated in millimeters are at the side of the sliding bars so that one always knows the distance of the parallel wires from each other.

At the sides of the instrument strong wooden ledges are attached to each of the vertical posts, and to these are affixed on the one side a holder for the fluorescing screen and on the other a similar one for the photographic plate holder. Both, screen and photographic plate holders, are easily secured to the uprights by means of suitable hinges.

The transverse piece which forms the top of the stand holds a movable arm to which the X-Ray tube holder is secured.

When an examination is to be made the patient stands or sits in close proximity to the anterior surface of the measuring frame which has been adjusted to the proper height.

The Barium-Platino-Cyanide screen is then placed behind the frame with its layer side turned to view of operator.

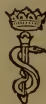
In front of the patient, at a distance of about 20 inches from the screen, the *Roentgen* tube is adjusted. If now the room is darkened the wires will be distinctly seen crossing each other as thin lines on the light screen, and outlined upon the shadow of the body. Since the measuring frame as well as the light screen is supported by the stand, both hands of the operator will be free and he can fix each wire at any desired point by grasping the proper pair of slides upon the sliding bars.

By means of two such cross wires one can fix any desired point, in an organ which is to be inspected with accuracy, while if four wires are employed an entire organ, for example the heart, can be circumscribed and inspected. Then by setting another wire upon some particular part of the body, the position in the body of the organ in question can be determined with considerable precision. If the illumination that have been obtained does not enable one to reach a conclusion with sufficient definiteness, the camera can be substituted for the light screen and the desired measurements obtained by means of a photograph of the lines and shadows.

In the case of comparative measurements the conditions must be exactly the same when the light screen is used as when one uses the camera. Especially must this be the rule in regulating the distance of the *Roentgen* tube from the photographic plate or from the light screen.

G/6245 Hoffmann's Measuring Stand for X-Ray Investigations, as per description, complete with plate holder and fluorescent screen. Price..... **\$125.00**

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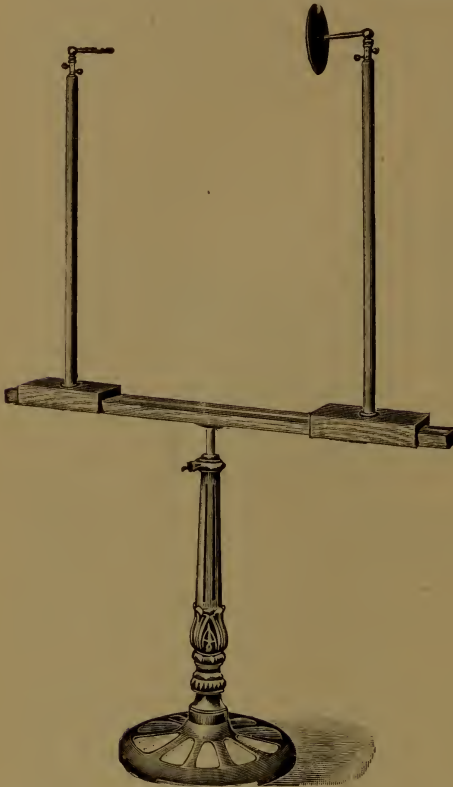
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Spark-Gaps.



G/6256

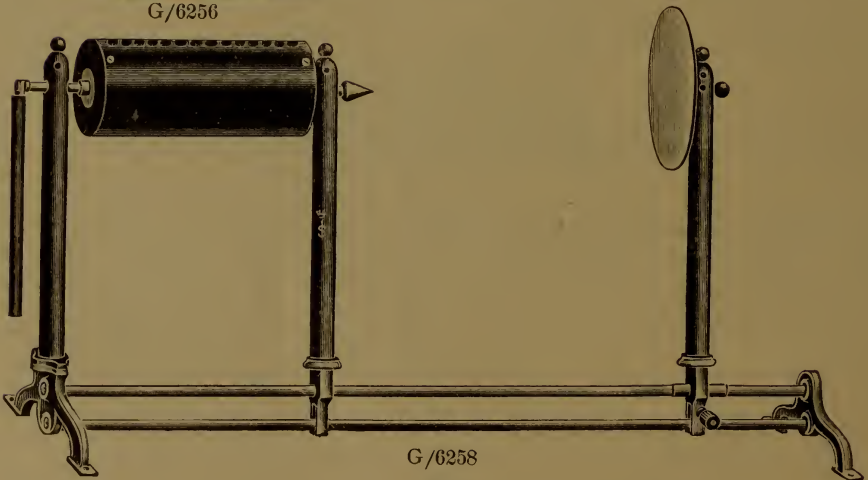
G/6256 Spark Gap and Rectifier, for
Code PERM direct current. Offers an efficient safeguard against overloading X-Ray tubes especially when using strong currents with an electrolytic interrupter. Soft tubes in particular should never be excited without having a vent tube G/5890 or one of these spark-gaps in series.
 The apparatus consists of an iron pedestal on top of which is fastened at right angle a hard wood bar with scale upon which slide the uprights, one of them having a metal disc and the other a pointed metal rod. Price\$35.00

G/6258 Spark Gap and Rectifier, for
alternating current, consists of two horizontal rails, upon which are mounted two stationary uprights, supporting a hard rubber enclosed Rectifier and one sliding upright with metallic disc.

Code PER0A For Coils up to 12 in. Spark, . 45.00

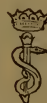
Code PERPE " " " " 16 " " .. 50.00

Code PERQU " " " " 20 " " .. 55.00



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Devices for Measuring Penetration of X-Rays.

Various kinds of apparatus have been constructed by different authors for estimating the intensity of X-Rays and for measuring the degree of the vacuum of X-Ray tubes.

The principle of their construction is based upon the insertion of an obstacle to the rays which is accomplished by small, square pieces of tin foil or platinum sheet of certain predetermined thicknesses, interposed between the fluorescent screen, and the eye of the observer. The gradual increase of thickness of the foil or layer of foils is indicated by small figures made of lead, fastened to the squares of tin foil and which appear more or less distinct according to the penetrating power of the tube.



G/6265

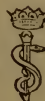
Recently *Walter* has constructed a skiometer, the metallic plates of which are made thicker in proportion to geometric instead of arithmetic progression and in which platinum foils are used instead of tin foils. By this method only a small number of lamellae is required which makes the numbering with lead figures superfluous. Eight Apertures are used in this apparatus. The fluorescent screen when used with a soft tube shows but one lamella and the number of visible lamellae is increased in proportion to the higher penetration of harder X-Ray tubes.

The *Benoist* photometric scale also permits a minute precision of the degree of vacuum and its principle is based upon the transparency of metals with an atomic weight of 100 to 150.

Following we quote some of the best and most practical devices in use at present. The problem of standardizing the quality of X-Rays delivered from the various styles and patterns of X-Ray tubes is a question very much agitated at the present time by the various X-Ray societies. We are keeping abreast with the progress of the times, and may, before long be able to present something new for the purpose.

G/6265 X-Ray Penetration Gauge of *Dr. S. H. Monell*, consisting of twenty shutters of sheet brass, stamped and numbered, complete with floor stand. Price..... **\$18.00**

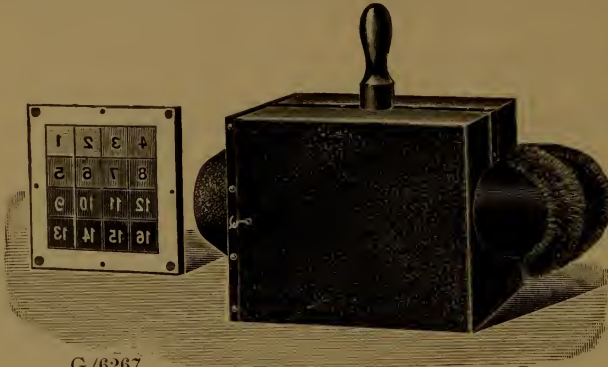
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G/6267

G/6267 Skiameter,
Code PERSE consisting of an enclosed box with handle, a fluorescent screen 5x5 in. with 16 tin foil squares of varying thicknesses, complete with screen of Platinobarium Cyanide.

Price.....\$25 00



G/6269

G/6269 Skiameter, Dr.

Code PERU *Walter*, as described above, with 8 platinum fields.

Price complete.... 25.00

G/6272 Skiameter, Benoist's,

Code PESCA consisting of 12 Aluminum discs of varying thicknesses, arranged about a silver plate.

Price..... 15.00

Each skiameter is carefully tested by a standard apparatus before being sent out.



G/6280



THE KNY-SCHEERER CO. N.Y.

G/6280 Chromo-Radiometer, Dr. Holzkecht's. This Apparatus is intended to enable the physician to place the dosage of X-Ray treatment upon a more exact basis. The inventor determines the amount of X-Rays absorbed by a certain salt, in comparing the discoloration resulting in this body from irradiation with a standard scale of color shades.

Holzkecht argues, that by such comparison conclusions may be drawn as to the amount of X-Rays absorbed, and, therefore, also as to the probable physiological effect of the same amount of rays.

Complete set consisting of a standard scale of 12 test objects of different shades of discoloration, for the purpose of comparison and 12 *Reagent* tablets which will discolor under the influence of X-Rays. Price..... 50.00
1 dozen Reagent Tablets separate..... 12.00

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Osteoscopes.

Most operators prefer to test the vacuum of a tube by holding their own hand before the fluorescent screen as indeed the hand is a most reliable indicator, since it contains many different types of bones from the massive carpal end of the radius to the delicate third phalanx of the little finger. But such constant tests are dangerous and lead to pathological changes of the integument which may become permanent as the wrinkled and shrivelled *Roentgen* hands of physicians show.

Instead of sacrificing the living extremity *Dr. Carl Beck* has suggested the utilization of the skeleton of a hand and arm. The bones of the forearm and hand are fastened to a sheet of pasteboard or similar translucent material. This board can be attached to a fluorescent screen, and by moving it back and forth the phalanges, the carpus or elbow can be studied. The inventor has given these contrivances the name of **Osteoscope**.



G/6283

G 6283 Osteoscope, *Dr. Carl Beck's*, with skeleton of human hand, complete with
Code PESTY Platino-Barium Cyanide Screen, size 5 x 7 inches. Price. \$20.00

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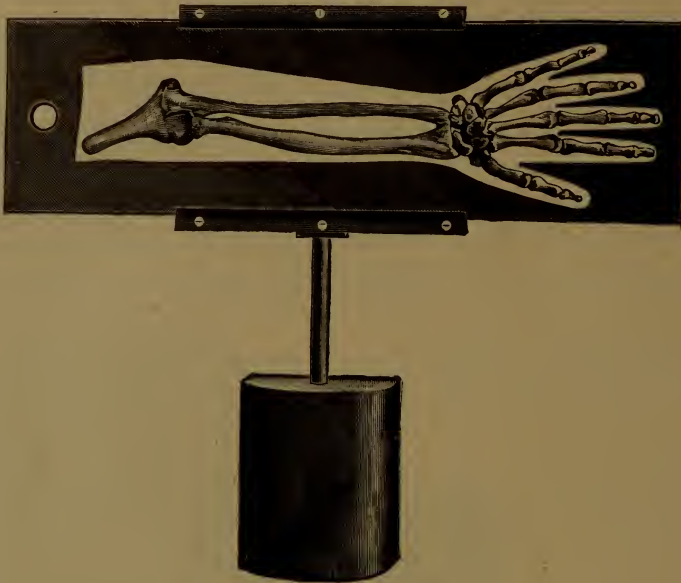


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G/6284

G/6284 Osteoscope, Dr. Carl Beck's, with skeleton of human hand and arm,
 Code PETAW mounted on sliding board, complete, with Platino-Barium Cyanide
 Screen 5 x 7 inches. Price **\$25.00**

Cabinets for Roentgen Rooms.

As one of the indispensable parts of an X-Ray room equipment may be considered a cabinet for storing X-Ray tubes, fluoroscopes, fluorescent screens and sundry photographic utensils.

The X-Ray tubes are to be safely placed upon shelves provided with suitable arrangements guarding them against breakage. Fluoroscopes and screens are kept away from light and the harmful influence of moisture. The photographic dry plates are preserved in a lead-lined compartment to protect them from the penetrating X-Rays and yet have them handy for immediate use. In fact the cabinet serves a number of useful purposes. We are limiting ourselves in this catalogue to two patterns G/6400 and G/6402, but are prepared to submit estimates for special designs.

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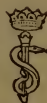


G/6400

G/6400 Roentgen Ray Cabinet. The Cabinet part with glass doors, is fitted with tube racks and partitioned in such manner that two independent sections are formed. The doors are equipped with automatic locks, requiring a key to open them. One drawer is lead lined and perfectly ray-proof for exposed and unexposed plates. The cupboard on side is provided with shelf for sundry articles as fluoroscopes, etc., while the compartment on top is sufficiently spacious to hold developing trays, graduates, etc. Price \$65.00

Code PINTO

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G/6402 Roentgen Ray Cabinet,
Code PINXI
with Desk, similar to G/6400 but without top compartment. Price.... \$75.00

G/6408 Wall Rack, for X-Ray Focus Tubes.
Code PIONE
Where floor space is limited this rack will be found of great convenience. For six tubes.
Price... .. 12.00

G/6402



THE KNY-SCHEERER CO. N. Y.
G/6408

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THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

Protection for X-Ray Operators.

It has become a question of vital interest as to how to protect the operator from the injurious effects of long continued work in the field of practice. The loss of a hand or an arm is not a thing to contemplate with equanimity and protection should be sought in time before damage is done.

There is a type of chronic *Roentgen* light *dermatitis* which is especially found among physicians who devote much time to irradiation. The hands show the integument wrinkled and shrivelled, the nails horny and cracked and the phalanges thickened, so that there is tension during movement. In some cases the formation of warts and rhagades is observed.

Various forms of modern protective closets have been built, generally lined with lead sheeting and having as an observation window a pane of lead glass impervious to X-Rays. Such Cabinets are generally constructed especially to order and we are prepared to submit estimates upon application.

Following we give a list of standard apparatus for protection which are constantly kept in stock.

G/6450 Protective Plate Glass, of a lead flux, impervious to X-Rays. It is used
Code **PLAFO** for covering the Barium-Platino-Cyanide screen or for windows in protective Cabinets.

Standard sizes kept in stock are the following

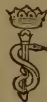
	$3\frac{1}{2} \times 4\frac{3}{4}$ in.	5×7 in.	$7 \times 9\frac{1}{2}$ in.	$9\frac{1}{2} \times 12$ in.	12×16 in.
Price each	\$ 0.35	0.70	1.35	2.30	3.80

Larger and intermediate sizes at the price of 3 cents per square inch.

G/6454 Protective Lead Foil with vulcanized sheet rubber coating on both sides. This material is by far the most suitable for protective purposes on account of its adaptability to any form and part of the human body. The rubber covering has been vulcanized directly upon the metal and stays on for ever. It can be easily washed and sterilized by placing it in boiling water for a reasonable time. We carry in stock two thicknesses of rubber covered lead foil, the thinnest style having a lead sheeting of $\frac{1}{100}$ in. diam. and the heavier style one of $\frac{1}{25}$ in. diam.

Price for lead foil $\frac{1}{25}$ inch diameter	$1\frac{3}{4}$ cents per square inch.	} Larger quantities at special price
" " $\frac{1}{100}$ " " "	$1\frac{1}{2}$ " " " " "	

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G/6445

G/6445 Protective Stand for Use in Radiographic Work. This stand or screen consists of a frame with two vertical side bars between which a thin sheet of hard rubber is movable up and down. This sheet or plate is steadied by an arrangement which is attached to one side of the frame and by which it can be quickly brought to any desired level. It gives protection from the effect of leaping sparks, and cuts out the secondary rays of the tubes. It is recommended for use in examinations.

Price.....\$25.00

Treatment of Inflammations caused by the X-Ray.

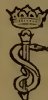
In SIMPLE DERMATOSIS (burn of the first degree) warm applications of Burow's Solution are most comfortable to the patient.

For the BULLOUS FORM (second degree) use Xeroform Gauze Dressing, 10 per cent., 40 cts. per sq. yard in glass jar, or Xeroform Powder, sprinkled upon the surface and bandaged by gauze, 55 cts. per oz., later a dressing of Xeroform-Lanolin Ointment, 10 per cent., 25 cts. per oz., or Ichtyol-Lanolin, 25 cts. per oz. is recommended, which is changed daily, provided there is but scant secretion.

The NECROTIC FORM (third degree) requires speedy removal of the mortified tissues; the after-treatment is conducted on the ordinary principles of wound treatment.

The above mentioned Drugs are constantly kept in stock.

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Protection for X-Ray Operators.



G/6456

G/6456 X-Ray Practitioners' Pro-

Code PLAQU **TECTIVE SUITS** are made of

the rubber covered lead foil, described under G/6454. Illustration shows in which way they can be applied. An equipment consisting of G/6457,

G/6458, G/6459 and G/6465.... **\$30 00**

G/6457 Apron of rubber covered

Code PLATA lead foil, with straps for

fastening the same **16 50**

G/6458 Protective Hood of lead

Code PLAU foil, rubber, covered with

tapes..... **8,50**

G/6459 Pair of Protective gloves

Code PLEBE made of leather with heavy

leather lining. Between the

lining and the uppers there is a

composition of lead which ab-

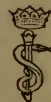
sorbs the X-Rays. Pair..... **5.00**

G/6465 Pair of Spectacles made of

Code PLENO lead glass absorbing the

X-Rays. Pair **2.75**

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SKIAGRAPHY.

There can be no doubt that structural details of anatomical parts can be shown to better advantage by a photograph than on the fluorescent screen. The skiagraph not only permits the thorough study of the various features of a lesion but can also be preserved and will be of value for future information.

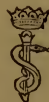
A busy practitioner, it is true, cannot personally devote much time to the purely mechanical task of developing negatives, and may prefer to employ the services of a professional photographer as the developing process of a skiagraphic plate is practically the same as that of an ordinary photographic plate exposed to sunlight. It must, however, be considered that the anatomical knowledge of a physician combined with some experience in developing skiagraphs will soon enable him to bring out with greater accuracy anatomical details to which a professional photographer would pay no attention.

The prime considerations of an equipment are few. A proper adjustable ruby light. A working table, shelves, trays, and running water are needed besides the chemicals. The temperature of the developer is a matter of great importance. If it is too warm, the plates are likely to fog; and if too cold, development proceeds very slowly. If possible, the temperature should not be allowed to vary beyond the limit of 65° and 70° F.

With an X-Ray negative development may be continued for a much longer period than would be advisable with a camera exposed plate, and the usual error of the professional photographer in developing an X-Ray negative is that of under-development. The problem of determining just when development has been carried far enough is a difficult one, and must be acquired by practice. In order to obtain sufficient density of the negative it is necessary to proceed with development until the plate is perfectly opaque to the ordinary ruby light of the dark-room lamp. Success requires a great amount of patience and skill.

If the beginner develops a hand on his first plate and a pelvis on the second, he will be greatly instructed in the different rendering of the image as he observes it during development. The plain outlines of the hand will delight the beginner, while the obscurity of the pelvis from first to last may possibly discourage him. However practice makes perfect, and it is well to bear in mind that the art of developing radiographs is not learned in a day.

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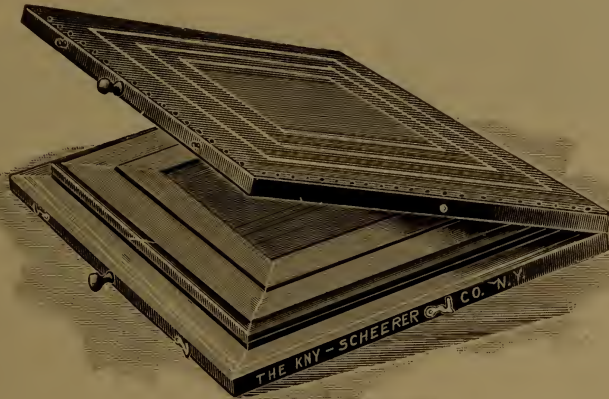
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Plate Holders.

In the simplest form of X-Ray work, the plate is exposed in envelopes, as they are listed under X-Ray Plates, but the use of intensifying screens necessitates the addition of a good Plate Holder. They are made so as to take several sizes of plates and have sizes outlined on cover correspondingly. In ordering state the largest size of plate for which they may be wanted. For the smaller sizes we furnish a set of mats to fit properly into the larger space. The plate must be changed in the dark-room. No envelope is used in this plate holder. The latter acts as a protection against breakage. A holder can be used for plain exposures if preferred to the paper envelopes, but is designed to permit the employment of one or two intensifying screens against which the film is placed and the holder closed. When closed it is light-proof.



G/6510

G/6510 Plate Holder, very best quality for plates, 11x14 inches, with set of
Code POTH0 mats, adopted to plates 5 x 7 in., 7 x 9 in., 8 x 10 in. and 10 x 12 in.... \$15.00

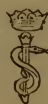


G/6513

G/6513 Plate Holder for stereoscopic radiography, will allow a ready
Code POU1 removal of the exposed plate and insertion of a second plate without
disturbing the patient. Size 11 x 14 inches. Price 15.00

G/6517 Intensifying Screens of tungstate of calcium, without frame, size 11 x 14
Code POUY1 inches, fitting plate holders G/6510 and 6513. 15.00

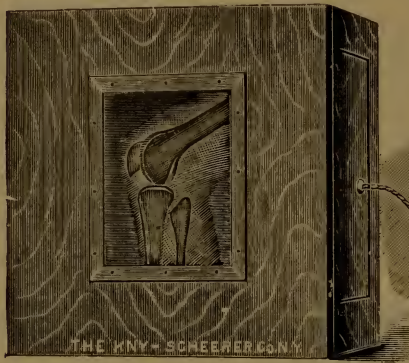
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G/6525

G/6525 Illuminating Box for Negatives. Very often it is extremely difficult to obtain a true print from a radiographic negative as the finer detail is lost either through printing or toning the print. An illuminating box as above illustrated is, therefore, a valuable accessory, and allows the very finest detail to be readily studied.

Code PVOA

The box is made of oak lined with asbestos, and wired for four incandescent lamps. A set of four shutters allowing all sizes of plates from 4 x 5 inches to 11 x 14 inches is furnished with above.

Price..... \$20.00

G/6526 Same as above, fitted with rheostat to reduce brilliancy of lamps. Price complete..... \$25.00

Code POZY



G/6529

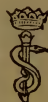
G/6529 Protective Box for Sensitized Plates. A number of practitioners have experienced difficulty in storing sensitized plates, as it is necessary at times to examine the part with a fluoroscope shortly before making skiagraphic exposure. The unprotected plates within the reach of the X-Ray become "fogged" and worthless.

Code POZZY

The box is constructed of oak, handsomely finished, the interior lead lined. The cover is fitted accurately and furnished with safety lock.

Box for Plates 8 x 10 in. or less. Price \$10.00
 " " " 11 x 14 " " \$12.00

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Choice of Plates for Radiography.

Radiographs may be made on photographic papers, films or glass plates. Good pictures have been made with every kind of plate, film and emulsion.

To assure best success, we are prepared to furnish special "X-Ray Plates," with a heavier coating.

For the convenience of patrons, we stock a domestic and an imported plate of standard sizes. In the United States the *Cramer* X-Ray Plate is considered one of the best by authorities, while in Europe the finest radiographs are made with X-Ray plates made by German Manufacturers.

Heretofore a number of specialists have imported these for their personal use and have deemed them worth the additional cost. We have secured the exclusive agency and control of the products of the best maker for the United States and Canada, and carry in stock a good assortment of the various sizes.

Photographic X-Ray Plates.

Made expressly for X-Ray work. These plates are reliable, uniform in results and easy to manipulate. The same developer and fixing bath as for ordinary plates can be used, but on account of their extreme sensitiveness, great caution must be exercised while handling and developing, by not exposing more than is actually necessary.

We have discontinued packing these plates in the paper envelopes, as the contact of paper affects the sensitized surface and materially injures their keeping qualities. We, therefore, furnish the envelopes separately, into which the plates can be readily inserted as required for use.

Special List per Dozen.

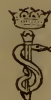
We quote them with black and orange envelopes, which are enclosed in each package. We also quote them **without** envelopes, but unless specified will send **with** envelopes.

PRICES PER DOZEN.

Cramer's X-Ray Plates.		
Sizes.	Without Envelopes.	With Envelopes.
5 x7.....	\$1.10.....	\$1.40
6½x8½.....	1.65.....	2.10
8 x10.....	2.40.....	3.00
10 x12.....	4.20.....	5.15
11 x14.....	6.00.....	7.25
Packed ½ dozen in each box.		

Imported X-Ray Plates, Double Coated		
Sizes.	Without Envelopes.	With Envelopes.
5 x7.....	\$1.60.....	\$1.90
6½x8½.....	2.40.....	2.85
8 x10.....	3.50.....	4.10
10 x12.....	6.00.....	6.95
11 x14.....	8.45.....	9.70
Packed ½ doz. in each box.		

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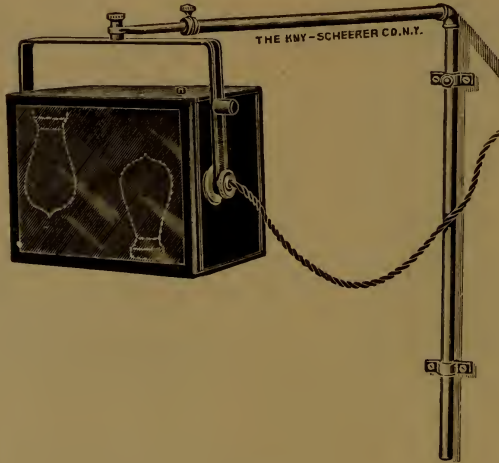


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G/6540

G/6540 Dark Room Ruby Lamp, Dr. Caldwell's. A most convenient apparatus consisting of nickel plated wall bracket, which may be raised and lowered as well as moved sideways to suit occasion. The box part is made of tin tastefully japanned and decorated, two electric bulbs of 16 C. P. each are placed within, and a series of 4 orange and ruby glasses allow any amount of light to strike the developing dish. Means are also provided by which the lamp may be tilted to any angle for examining plates in washing trough.....

\$18.00



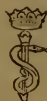
Argand Gas Burner with ruby chimney, for attachment to any ordinary gas bracket. By the cut it will be seen that the patent Argand Burner has been so modified as to intercept the downward radiation of the light, and protection above is provided in the same manner as with the oil lamp. The chimneys of both gas and oil lamps are not made of the ordinary ruby glass, but of what is known to the trade as copper-flashed.

Price of the Ruby Gas Burner and Chimney.....	2.50
Extra Ruby Chimneys	0.30

These burners are also manufactured on metal stands with a connection for rubber hose, by which they may be used at any distance from the gas bracket.

Stand, extra.	0.50
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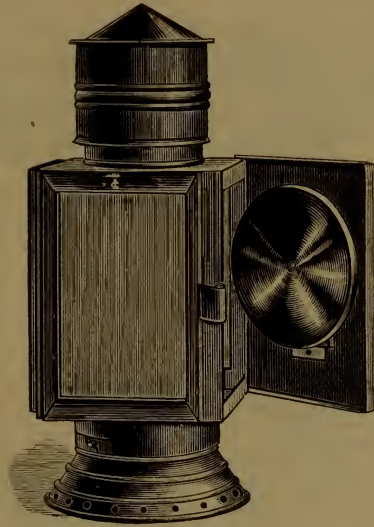
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Climax Dark Room Lantern (Patented). This is truly the best lantern for its price to be found. It has three large illuminating surfaces and reflector. The glass is of the correct non-actinic hue.

Price..... \$2.00

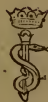
Accessories for Radiography.



Developing Trays, rectangular, white steel porcelain.

Dimensions, 4 x 8 $\frac{1}{4}$ in	\$0.55	Dimensions, 10 $\frac{1}{4}$ x 8 $\frac{1}{4}$ in	\$1.50
" 5 x 4 $\frac{1}{4}$ "	0.65	" 11 x 9 $\frac{1}{4}$ "	2.10
" 5 $\frac{1}{2}$ x 5 $\frac{1}{2}$ "	0.75	" 12 $\frac{1}{4}$ x 10 $\frac{1}{4}$ "	2.50
" 7 $\frac{1}{2}$ x 5 $\frac{1}{2}$ "	0.90	" 14 $\frac{1}{2}$ x 12 $\frac{1}{4}$ "	2.75
" 8 $\frac{1}{4}$ x 6 "	1.05	" 16 $\frac{1}{2}$ x 14 $\frac{1}{2}$ "	3.50
" 8 $\frac{3}{4}$ x 7 "	1.20	" 18 $\frac{1}{2}$ x 16 $\frac{1}{2}$ "	4.80
" 9 $\frac{3}{4}$ x 7 $\frac{1}{2}$ "	1.35	" 20 $\frac{1}{2}$ x 18 $\frac{1}{2}$ "	5.25

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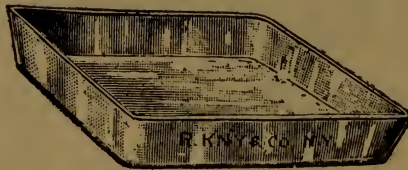
Telegraphic Address: EXRAY-NEW-YORK.



Developing Trays, Porcelain, slanting walls with lip.

Dimensions of bottom, 4 x 5 in.	\$0.50
" " " 5½ x 6¼ "	0.60
" " " 5 x 7 "	0.65
" " " 6 x 8 "	0.80

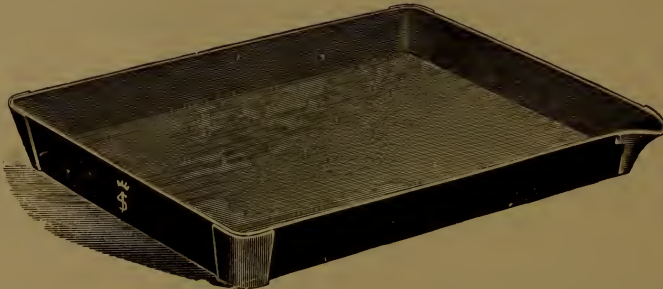
Dimensions of bottom, 7 x 9 in.	\$0.90
" " " 8½ x 10¼ "	1.15
" " " 10¼ x 12½ "	1.80
" " " 12½ x 14½ "	2.75



Developing Trays, Glass, square form, strong, clear crystal glass, polished edges and slanting walls.

Bottom dimensions, 5¼ x 4¼ in.	0.55
" " 6½ x 5¼ "	0.65
" " 8½ x 6¼ "	1.10
" " 9½ x 7½ "	1.20
" " 10½ x 8½ "	1.50

Bottom dimensions, 12½ x 9½ in.	2.15
" " 13½ x 11½ "	2.60
" " 14½ x 12½ "	3.50
" " 21 x 17 "	12.00

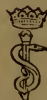


Hard Rubber Trays. These goods, manufactured of genuine hard rubber, have been long and favorably known to the profession, and met with universal approval.

Size.	Price.
4¼ x 5¼	0.60
5¼ x 7¼	0.75
5½ x 8½	0.85
7 x 9	1.05
8½ x 10½	1.35
10¾ x 12¾	2.00

Size.	Price.
12x16	3.10
15x19	5.20
18x22	6.60
19x24	7.40
21x26	9.35

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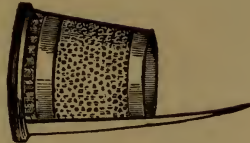


Developing Gloves, heavy black. Sizes 6, 6½, 7, 7½, 8, 8½ and 9.

Price per pair..... \$1.50



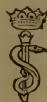
Finger Cots, extra heavy, for developing. Price per doz 0.60



The Efficient Plate Lifter. This plate lifter is very similar to an ordinary open end thimble, with a pointed piece of metal soldered securely to it, as shown in the illustration.

Price.....each 0.15

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Accessories for Radiography.

Graduates for Mixing Solutions.



Graduate, Tumbler Form



Graduate, Tall Form



Graduate, Cylindrical Form

Graduates, tumbler form, with lip, graduated in ounces and metric system.

A. Graduated in ounces.

60 Minims, each	\$0.28
120 " "	0.30
1 ounce "	0.20
2 " "	0.25
4 " "	0.30
8 " "	0.45
16 " "	0.75
32 " "	1.40

B Metric system.

5 c. c., each.....	\$0.30
10 c. c., "	0.35
30 c. c., "	0.25
60 c. c., "	0.30
125 c. c., "	0.35
250 c. c., "	0.55
500 c. c., "	0.85
1000 c. c., "	1.50

C. Combined ounces and metric.

\$0.35
0.40
0.35
0.40
0.50
0.75
1.10
1.85

Graduates, glass, tall form, with lip.

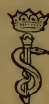
Capacity, 60 c. c., each.....	\$0.70
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Graduates, glass, cylindrical form with lip.

Capacity, 50 c. c., each..	0.60	Capacity, 500 c. c., each.....	1.25
" 100 c. c., " ..	0.90	" 1000 c. c., "	1.85
" 250 c. c., " ..	1.20		

Glass Stirring Rods, each 0.05

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FUNNELS.



Glass Funnel, regular style, with oblique tip.

Diameter, 2 in	\$0.09
" 3 "	0.12
" 4 "	0.15
" 5 "	0.25
" 6 "	0.30



Funnels, white steel porcelain, with handle.

Diameter, 2½ in., each...	\$0.35
" 2¾ " " " "	0.40
" 4 " " " "	0.45
" 4¾ " " " "	0.50
" 5½ " " " "	0.55
" 6¼ " " " "	0.75
" 7 " " " "	0.90
" 8 " " " "	1.00

PITCHERS FOR DARK ROOMS.

Where no running water is available a pitcher and a pail of good size will be found of value.



Form A.



Form B.

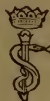
Pitcher, white steel porcelain, seamless. Form A.

Capacity, 2½ quarts.....	1.50
" 3½ "	1.75
" 6 "	2.50

Pitcher, white steel porcelain, with oblique top and seam, round hollow handle. Form B.

Capacity, 6½ quarts.....	1.75
" 9 "	2.00
" 11 "	2.50

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Water Pail, seamless, without foot, white steel porcelain.

Size, 9½ in. diameter, capacity 8 quarts.	\$1.30
" 10¼ " " " 9½ " "	1.60
" 11 " " " 12¾ " "	1.90
" 11¾ " " " 15¼ " "	2.25
" 12½ " " " 18 " "	3.00



Drop Bottle.



Alcohol Lamp.

Drop Bottle, for conveniently stocking bromide of potassium solution etc.

1 ounce, clear glass	0.20
2 " " "	0.25
4 " " "	0.35

Alcohol Lamps, for conveniently reducing vacuum of X-Ray Tubes, with ground-in stopper in tubulature, with glass hood ground on.

Size, 30 c. c. capacity ..	0.60
" 60 " "	0.75

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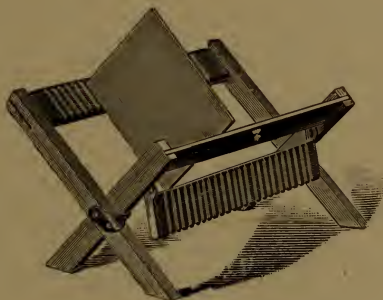
Telegraphic Address: EXRAY-NEW-YORK.

Negative Drying Racks.



Is a strong, well built rack of large size. It holds 42 negatives, and will accommodate the largest sizes as well as the smaller ones.

Price..... \$1.25



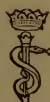
For small size negatives up to 8 x 10, made up in the plain wood, without any finish.

Price..... 0.25

Negative Printing Frames, with hinged back and dressed celluloid tablet for recording memoranda.

5 x 7 in	\$0.50	14 x 17 in	\$2.75
5 x 8 "	0.52	16 x 20 "	3 50
6½ x 8½ "	0.60	17 x 20 "	3.75
8 x 10 "	0.75	18 x 22 "	4.00
10 x 12 "	1.25	20 x 24 "	5.00
11 x 14 "	1.80		

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THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

Chemicals for Developing, Fixing and Toning.

Acid, Acetic, No. 8, per oz., in bottle.....	\$0.06
“ “ “ “ lb. “	0.18
“ Muriatic, C. P., “ oz., in glass stop bot.....	0.11
“ Sulphuric, C P., per lb., in glass stop bot.....	0.32
Alcohol, Photo 95%, per qt., in bottle.....	1.00
Alum, Powdered, in 5 lb. Boxes, per lb.....	0.11
“ Chrome, in 1 lb. carton.....	0.13
Borax, Powdered, in 5 lb. box, per box.....	0.75
Gold Chloride C. P., Dry, per bottle.....	0.50
Hydrochinon, per oz.....	0.15
Lead, Acetate, per oz.....	0.10
Mercury, Bichloride, in lb. bottles, per lb.....	1.16
“ “ in oz. bottles, per oz.....	0.15
Metol, per oz.....	0.75
Pot. Bromide, per oz.....	0.10
“ Carbonate in lb. bottles, per lb.....	0.24
“ Cyanide “ “ “ “	0.60
“ Ferricyanide Red, in ¼ lb. bottles, per bottle	0.25
Soda Bicarb. cryst. in lb. box, per lb.....	0.10
“ Hyposulphite, in lb. boxes, per lb	0.10
“ “ “ in 5 lb. boxes, per lb.....	0.06
“ Sulphite cryst., in lb. bottles, per lb.....	0.16
Sodium Bromide, in oz. bottles, per oz.....	0.10

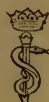
Developing Powders of Metol and Hydrochinon carefully compounded, each tube to be dissolved in ten ounces of water, very convenient for the busy practitioner.

Box of 5 Tubes. Price 0.10

Hyposulphite of Soda, C. P., for fixing negatives.

Per box of 1 lb..... 0.10

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APPARATUS
FOR THE TREATMENT WITH
HIGH FREQUENCY
CURRENTS.

THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

High Frequency Currents.

Currents of high frequency are manifestations of electric force, and just as the faradic current distinctly differs in tension and therefore in effect according to the nature and construction of the coils, so high frequency currents differ according to the nature of the electro-motive force producing them and the manner of their discharge. The term "High Frequency" is well applied. Hertz has shown that the vibrations of high frequency currents reach into the hundreds of millions per second.

This term "High Frequency" applies to the D'ARSONVAL CURRENT, the HYPERSTATIC CURRENT, and the ordinary STATIC VIBRATORY CURRENT. They are all obtained by a *step-up* process.

A remarkable and distinguishable characteristic of these currents of high frequency is the complete absence of motor or sensory effect. A high frequency current with its hundreds of millions of vibrations per second may be transmitted through the human body without either pain or sensation, and yet if an incandescent lamp is held between the two hands so that it receives the current it will glow instantly. The physiological effects produced by this painless and apparently innocuous manifestation of electric force have been made the subject of much patient investigation, and the general conclusion which has been reached is, that over and above a distinct modification of general nutrition, there is produced a decided increase in arterial tension, a greater elimination of CO_2 and an increase in the production of heat.

For the convenience of the medical practitioner, who may wish to combine with his X-Ray equipment the use of high frequency currents we furnish a transformer solenoid, the so-called "Resonator," which is placed on a bracket attachment connected with the X-Ray cabinet. Vacuum electrodes of glass and other electrodes of different designs can also be furnished). (See Figs. G/6110 to G/6149).

The irritant action which they produce depends more or less upon the resistance between the electrode and the conducting surface of the parts treated.

TREATMENT WITH HIGH FREQUENCY CURRENTS.

Treatment with currents of high frequency may be administered by at least four different methods:

First. *The Indirect Method of D'Arsonval or the Method of Autoconduction, as he termed it.*

Second. *The Indirect Method of Condensation.*

Third. *The Direct Bi-Polar Method.*

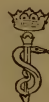
Fourth. *The Direct Method of OUDIN by Unipolar Treatment.*

The production of high frequency currents is common to all these methods. This results from the fact that the secondary poles of a large spark inductor are connected with the inner coating of two Leyden jars. The two layers are also connected with the binding posts of a spark micrometer. The outer coatings of the two jars are connected with one another by a spiral of copper wire, which is technically known as a *solenoid*.

The spark gap is concealed in a box with a removable cover and with sides of dark glass or mica in order that the dazzling sparks may not be seen and that their crackling may give as little annoyance as possible.

The mode of operation of this apparatus is as follows: the induction apparatus having been put at work the two jars are gradually charged with electricity of opposing polarity

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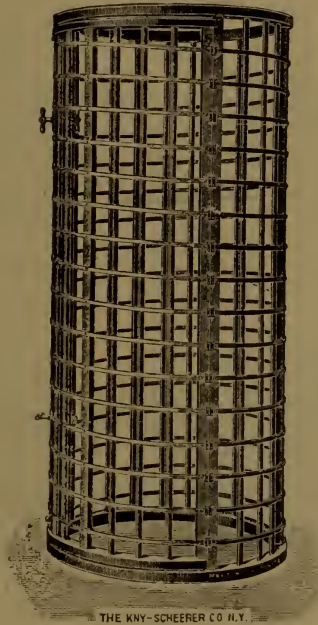
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Telegraphic Address: EXRAY-NEW-YORK.

until a discharge takes place between the balls of the spark micrometer and a spark leaps across the gap. This discharge, like every discharge from Leyden jars, has an oscillatory character; that is, it is composed of a great number of separate discharges. Each one of these discharges in the outer layer of the jars produces a corresponding discharge which traverses the solenoid. In other words, currents of high frequency are present in the solenoid. Notwithstanding the high tension of these currents, they are harmless to the human body.

TREATMENT BY THE D'ARSONVAL METHOD OF AUTO-CONDUCTION.

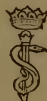
D'Arsonval bases his method of treatment upon the following facts: The solenoid in which the high frequency current circulates is of such large size that a full-grown person can sit or stand in it. At the same time he is in an electric field in which electrical currents pass through his body, and he does not come in contact with the solenoid at any point. D'Arsonval has termed this the method of *Autoconduction*. The results which have been obtained by treatment with this method, are improvement in sleeping, in physical energy and strength, in the appetite, in the performance of the menstrual function, and diminution of the uric acid together with increase of the urea in the urine. The results which have been obtained in diabetes and obesity are especially noteworthy.



G/6602

G/6602 Apparatus after D'Arsonval upright form for Auto-Conduction of the entire human body. The solenoid is provided with a door which opens outwardly and inwardly thus facilitating entrance and exit. Height 72 inches, diameter 30 inches, also provided with an incandescent globe with strap and an copper spiral..... **\$75 00**

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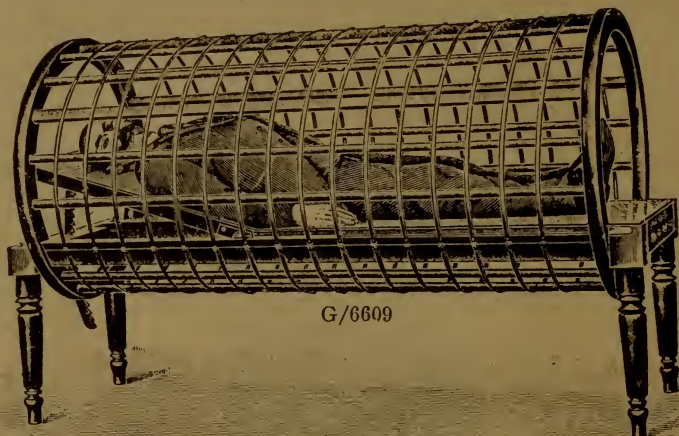
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A very practical form of the D'Arsonval apparatus is seen in Figs. G/6609 and G/6609a, in which treatment can be administered to the patient in a reclining position, the solenoid being placed horizontally. It consists of three parts, which are connected with each other by a hinge joint. The solenoid can be removed from the treatment table and then be placed in a vertical position (see Fig. G/6602), the table being then available, for Röntgen ray treatment. Further, by the addition of a mattress and an aluminium plate with binding posts, which can be attached to the table (see Fig. G/6609a); it can be converted into a condensation bed of the APOSTOLI type.



G/6609

THE KNY-SCHEERER CO. N.Y.

G/6609 Apparatus after D'Arsonval consisting of detachable Solenoid and condensation Bed of APOSTOLI type. The solenoid can be detached from table and be used in upright position like Fig. G/6602. The APOSTOLI type Condensation Bed can be used for X-Ray Skiagraphic and Treatment purposes.

Code RABAT.

Apparatus, complete with Aluminum plate, and Mattress..... \$120.00

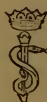


G/6609a

THE KNY-SCHEERER CO. N.Y.

Shows Apparatus D'Arsonval, converted into the Apostoli Type.
Condensation Bed.

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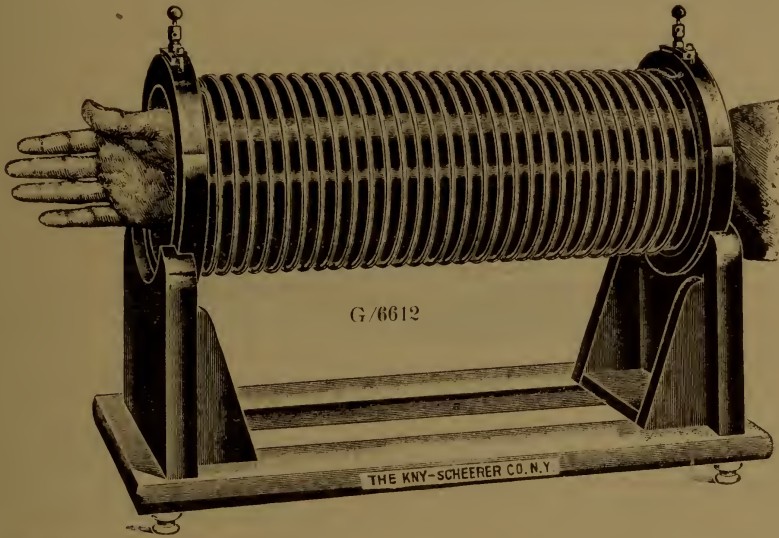
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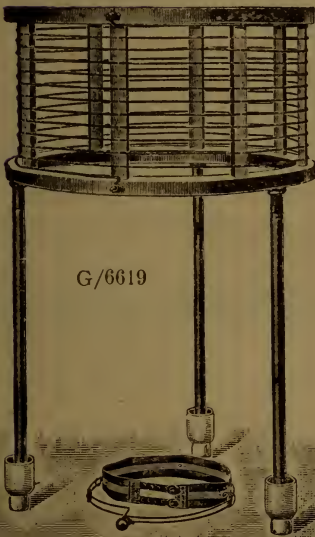
If a portion only of the body is to receive treatment solenoids may be procured which will be appropriate for the purpose. Figs. G/6612 and G/6619 represent solenoids for the treatment of the hand and abdomen.

The presence of the current within the solenoid may be demonstrated by introducing a spiral with a sufficient number of turns, the ends of which are attached to an incandescent lamp. The latter will at once be lighted without coming in contact with any portion of the solenoid.



G/6612 Apparatus after D'Arsonval
Code
HABLE
for autoconduction of the Arm,
consisting of a horizontal Cop-
per Spiral with frame and
binding Posts.

Price \$35.00

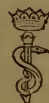


G/6619

G/6619 Apparatus after D'Arsonval
Code
RACE
for autoconduction of the
Abdomen, on high feet with
incandescent globe on Copper
Spiral.

Price..... 30.00

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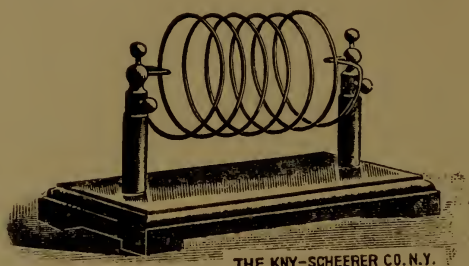
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TREATMENT BY CONDENSATION.

Another method of treatment is by means of the Condensation-bed devised by APOSTOLI. In this instance the body of the patient is exposed to a condensation effect. APOSTOLI'S apparatus consists of a bed made of some poorly conducting material under which a metal plate of large size is attached. This plate is connected with one end of a small solenoid (Fig. 6625), while the patient lying upon the bed is connected with the other end, thus performing the function of a condensor. The connection of the patient with the solenoid is effected by placing into his hand a metallic handle.



G/6625

G/6625 Small size solenoid for use in connection with *Apostoli's* Condensation Bed and for direct bi-polar treatment it consists of a copper wire spiral which is attached horizontally to two hard rubber uprights.

Price..... \$12.00

BI-POLAR TREATMENT BY THE DIRECT METHOD.

This method of treatment is comparable to that in which the faradic current is employed. It consists in placing the patient in contact with one end of the small solenoid above described (Fig. G/6625) by means of a large insulated foot-plate placed under his feet (Fig. G/6630), the current circuit being closed by means of a cylinder electrode (G/6633) in contact with the other end of the solenoid, the electrode being held in the patient's hand.



G/6630

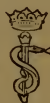


G/6633

G/6630 Insulation Foot Plate with binding post for bi-polar treatment..... 10.00
Code RADEW

G/6633 Cylinder Electrode for bi-polar treatment..... 3.00
Code RADIX

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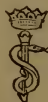
TREATMENT BY OUDIN'S METHOD.

In this method of treatment Oudin's Resonator is required. This consists of a vertical or horizontal solenoid, the numerous turns of which are wound about a polished hard wood frame. On the plate at the top of the frame is a conducting ball, to which the upper end of the coil is attached. The lower end of the solenoid coil is connected with a binding post which is fastened upon the plate at the bottom of the frame. The peculiarity of the Oudin Resonator consists in the fact that only one binding post, that being the lower one, is attached to the circuit closer of the outer layer of the two Leyden jars, while the upper binding post, which consists of a hard rubber conducting upright, separated from the ball and the upper end of the solenoid by a controllable spark-gap, is intended to receive the flexible copper conducting cord at the free end of which is attached the electrode which has been selected for the treatment of the given patient. *

To establish connection between the Resonator solenoid and the secondary or accessory solenoid (which also forms a portion of the apparatus), a flexible cord is used, one end of which is fastened to the lower binding post of the Resonator and the other to an adjustable connection with a hard rubber handle. According as this connection is secured to different points upon the accessory solenoid, different effects are obtained from the Resonator or primary solenoid. The maximum effect is obtained when the Resonator is connected with one end of the accessory solenoid and the other end is conducted to the ground. Under such conditions, and only under such conditions, flashes of static electricity are visible at the upper end of the Resonator.

The theory of action of the Resonator consists in the fact that while synchronous and very powerful currents are present in the accessory solenoid, with variations in the discharge spark, corresponding changes in tension take place at the point of contact with the Resonator which excite currents in the Resonator itself. These currents produce high tension by the auto-induction, which the several layers of wire exert upon each other, so that the resulting phenomena in the Resonator resemble those which are observed in an induction machine. This is particularly the case when the Resonator is in perfect harmony with the general arrangement of the apparatus. This occurs as already shown in the apparatus which has been under consideration when the Resonator is connected to one end of the solenoid while the other end is in contact with the ground. Under these conditions the current can be regulated and modified to suit individual cases under treatment by transferring the adjustable connection to the other end of the accessory solenoid. Fig. G/6644 shows an Oudin apparatus of a modified construction with an adjustable Resonator. It has the two solenoids united into a single vertical, adjustable one. In place of the clamp connection with hard rubber handle there is a sliding wheel, which moves along a vertical rod, which is in connection with the outer coating of one of the Leyden jars, while the outer covering of the other Leyden jar is in contact with the lower end of the solenoid coil. By the adjusting of this spiral, which is accomplished by means of the projecting pin at its lower end, the relation of the lower portion to the upper portion, which is the real Resonator, may be varied within wide limits and therefore regulated at will. This adjustable Resonator can be procured by itself if desired. (See Fig. G/6655.) It is to be used in connection with a pair of Leyden jars and the spark micrometer. It should be added that this apparatus has two binding posts (See Fig. G/6655) by which it may be connected with the outer coating of the Leyden jars. The inner coating is connected with the binding posts of the spark micrometer and the secondary posts of the spark induction apparatus.

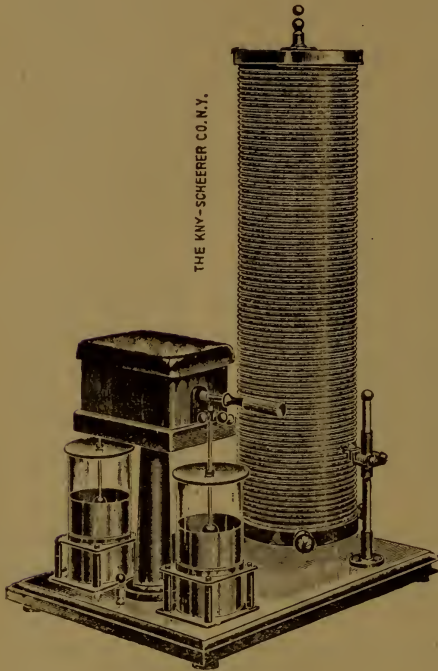
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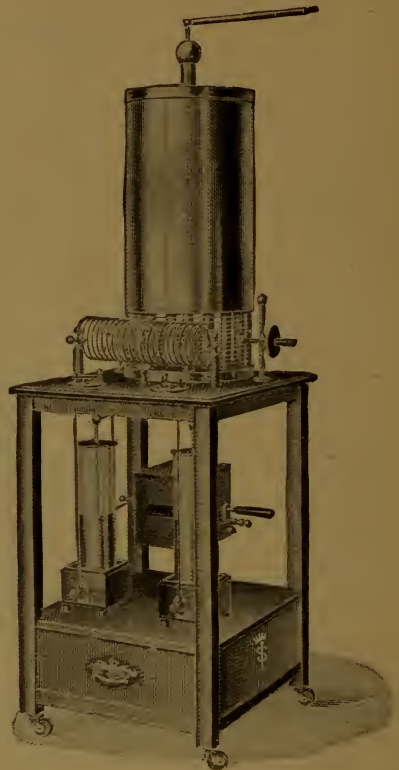
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Telegraphic Address: EXRAY-NEW-YORK.



G/6644



G/6646

G/6644 Oudin's Vertical Apparatus for the application of high frequency currents, equipment as per description on preceding page.

Code RADNO

Price \$60.00

G/6646 Oudin's Apparatus, compact form. To meet the requirements of Physicians who are limited for space, we have designed a stand upon which the various apparatus are mounted in a condensed but very practical form.

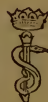
Code RADRY

The same set of Apparatus is placed upon a fine polished oak table provided with easy rolling rubber lined casters.

A drawer with lock and key, at the lower part of the stand, affords room for electrodes and accessories.

Price complete 75.00

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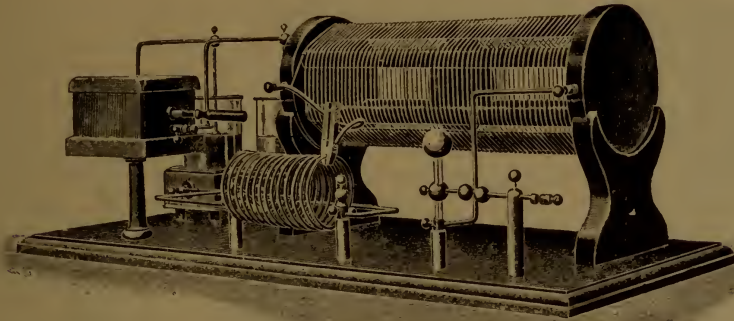


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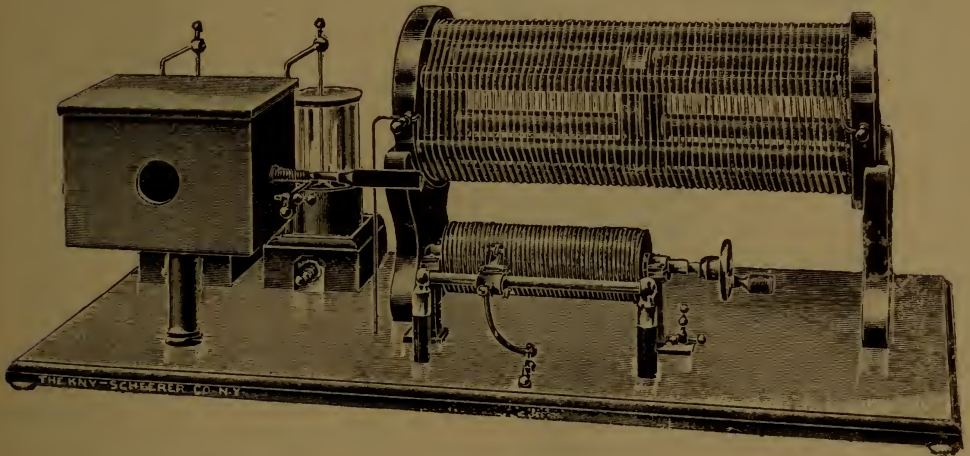
THE KNY-SCHEERER CO. N.Y.

G/6648

G/6648 Oudin's Horizontal Apparatus for the application of high frequency currents consisting of Spark Micrometer with Hard Rubber Handle, 2 Leyden Jars, 1 small horizontal solenoid, 1 Resonator after OUDIN with adjustable connections, mounted on fine polished wooden base.

Code RADOW

Price..... \$60.00



G/6649

G/6649 Oudin's Horizontal Apparatus As described in G/6648, with separate excitation Solenoid in shape of Wheatston Rheostat.....

Code RADPA

75.00

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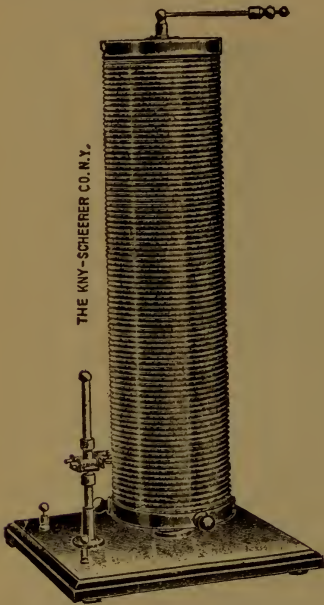


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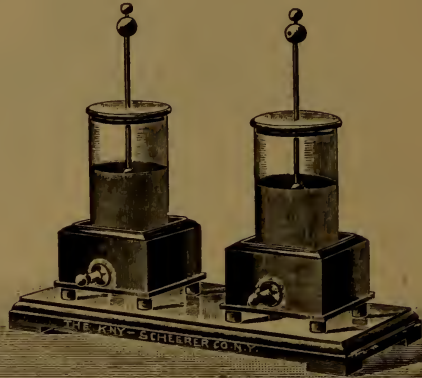
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Telegraphic Address: EXRAY-NEW-YORK.



G/6655



G/6662

G/6655 Oudin's Solenoid Resonator, on wooden base.

Code RADYN Price \$30.00

G/6662 Battery of 2 Leyden Jars, mounted on board, complete as per illustration.

Code RAFAL Price..... 20.00

N. B.—We are prepared to furnish smaller batteries of Leyden jars of cheaper construction and lower efficiency at correspondingly lower prices.



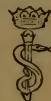
G/6667

G/6667 Spark Gap Micro-

Code **meter**, with hard rubber
RAFFI handle, in box with
glass or mica sides.

Price..... 18.00

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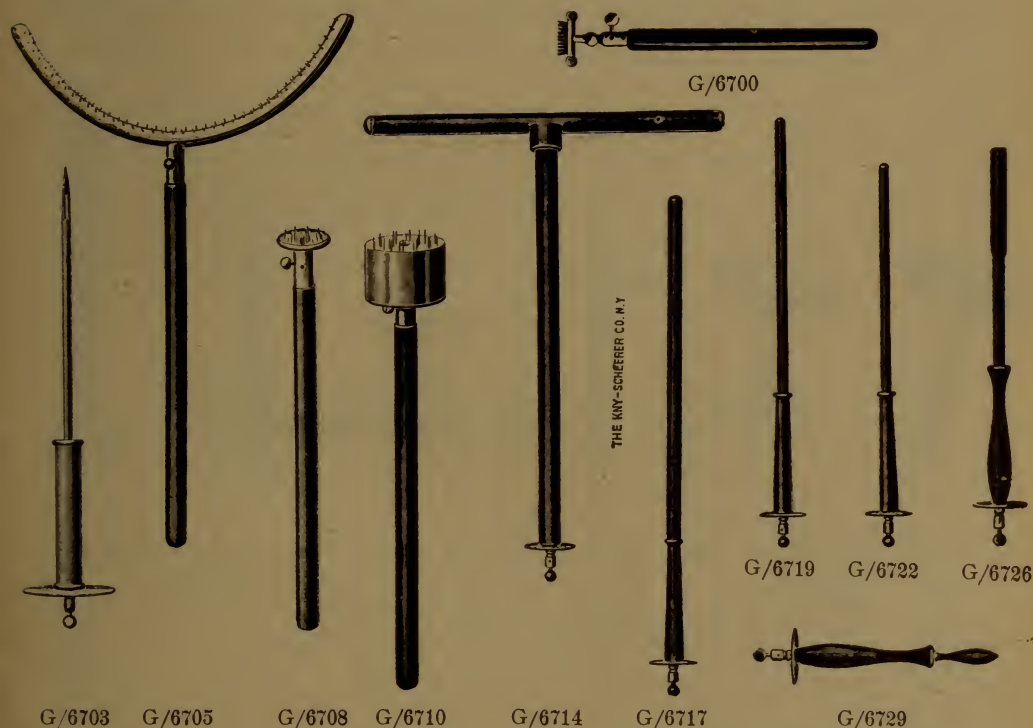
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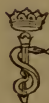
Electrodes.

Various forms of electrodes can be used with these types of apparatus. The brush electrode (Fig. G/6700) consists of an insulated hard rubber handle to which is attached a brush made of fine wires. This may be connected with a flexible conducting cord which proceeds from the Resonator. A similar attachment may be made by means of the pointed electrode (Fig. G/6703). Three other electrodes (Figs. G/6705, 6708, 6710) are designed for luminous currents. They terminate in fine metallic points and have long hard-rubber handles. Special forms of electrodes (Figs. G/6714 to 6729) are intended for the condensation method and are made of hard rubber. They contain a wire which runs through the center and is connected with the contact post at the end. By this arrangement the portion of the body which is to receive treatment does not come directly in contact with the means of conduction, but acts as a kind of condensor layer.

The electrodes shown in Figs. G/6717 to 6729 can be introduced within the body if necessary. The insulation of the condensor wire is so effective that the penetration of sparks and the consequent annoying of the patient is quite impossible.



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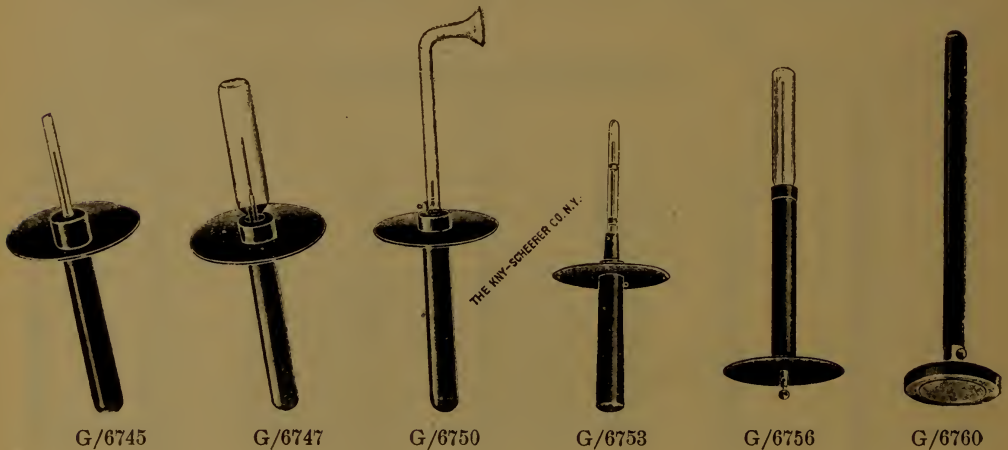
Telegraphic Address: EXRAY-NEW-YORK.

Code RAHDE	G/6700.	Brush Electrode of metal wire 10 in. long.....	\$4.00
" RAIAT	G/6703.	Pointed Electrode , 16 in. long	4.00
" RAIMO	G/6705.	Spray-Electrode , semicircular, 24 in. long	9.00
" RAINY	G/6708.	" flat circular plate with spray points, 18 in. long	5.00
" RAJAH	G/6710.	" " " heavier type, 22 in. long	6.00
" RAKKA	G/6714.	Condensor Electrode of hard rubber, 22 in. long.....	7.50
" RAKOS	G/6717.	" " " 21 "	4.00
" RAMAY	G/6719.	" " " 18 "	4.00
" RAMBU	G/6722.	" " " 16½ "	3.50
" RAMEE	G/6726.	" " " 15 "	4.00
" RANA	G/6729.	" " " 9 "	3.50

Figs. G/6745, 6747, 6750 represent glass condensor electrodes in which the condensor wire is fused in a vacuum glass tube. The tubes are made in white and blue glass.

Figs. G/6753 and G/6756 represent condensor electrodes in which the condensor wire is fused in a blue non-evacuated glass tube.

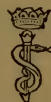
Fig. G/6760 represents a condensor electrode with felt disc and fish skin covering. The felt disc is to be moistened when this electrode is in use. When this is desired the upper part of the electrode, which is perforated, is unscrewed so that the fish skin can be removed and be pressed through the cap upon the felt. This electrode can also be obtained as an ordinary condensor electrode with hard rubber plate and without the felt disc and fish skin.



Code RANKE	G/6745.	Vacuum Condensor Electrode of glass, white or blue color	\$7.50
" RANNO	G/6747.	" " " "	7.50
" RAPHE	G/6750.	" " " "	7.50
" RAPPO	G/6753.	Condensor Electrode , blue glass, not evacuated....	6 50
" RASKO	G/6756.	" " " "	7.50
" RASSE	G/6760.	" " with felt disk.....	7 50

N. B.—A cheaper line of glass vacuum electrodes suitable for the treatment of the skin, vagina, rectum, etc., etc., are quoted under Figs. G/6140 A to H.

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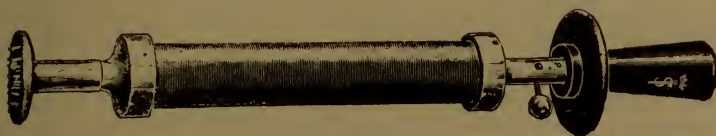
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The efficiency of the Electrodes may be considerably increased by a wire coil wound upon an insulating cylinder. The latter has Metal mounts on the ends. The lower part has a screw clamp and is slipped into an insulated handle. The upper part is arranged to receive the various electrodes.



G/6780 including Electrode G/6785

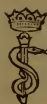
Code RATIO	G/6780 Resonator Electrode , with hard rubber handle without any electrode.....	\$15.00
	The following are electrodes used in connection with G/6780.	
Code RATRA	G/6785 Spray Electrode (as shown in illustration Fig. G/6708)....	4.00
" RATZE	G/6786 Brush Electrode (see Fig. G/6700).....	3.25
" RAUDE	G/6787 Spray Electrode semi-circular (see Fig. G/6705)	8.00
" RAVEN	G/6788 Spray Electrode (see Fig. G/6710).....	5.00
" RAYNO	G/6789 Condensor Electrode (see Fig. 6714)	6.75
" REALE	G/6790 " " (see Fig. 6722).	3.00
" REEDE	G/6791 " " (see Fig. 6726).....	3.50



G/6798

Code REGAL	G/6798 Resonator Electrode for condensation and conduction. The coil is enclosed in a bulbous end glass cylinder filled with oil for insulating purposes.	20.00
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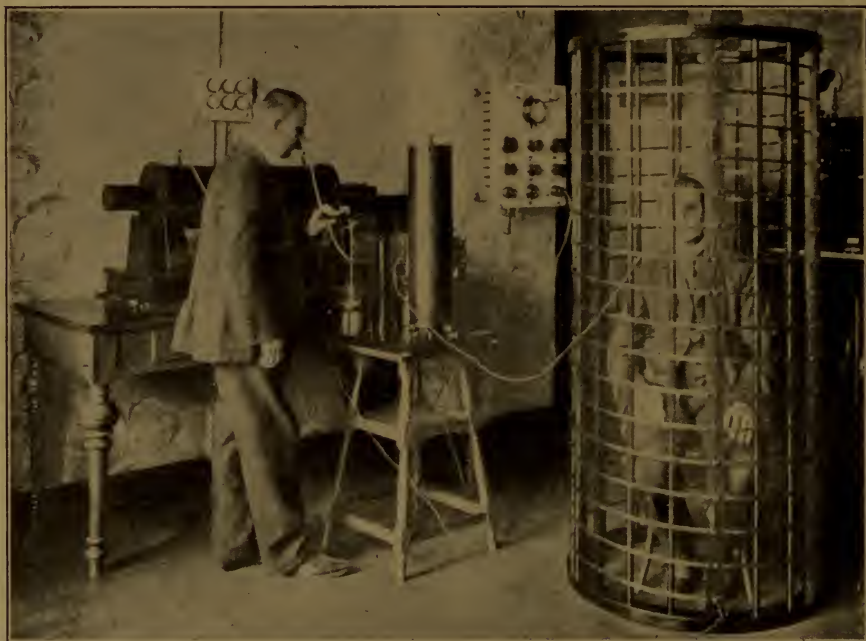
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Telegraphic Address: EXRAY-NEW-YORK.

Directions for the Use of the High Frequency Current Apparatus.

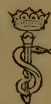


TREATMENT WITH THE D'ARSONVAL AUTOCONDUCTION APPARATUS.

For therapeutic purposes the D'ARSONVAL apparatus, the large cage-like solenoid is superior to all others. The arrangement of the apparatus is as follows: the two poles of the secondary spool of the spark induction coil are connected by insulated copper cords with the binding posts of the spark micrometer (Fig. G/6667) and the binding posts with the inner coating of the two Leyden jars (Fig. G/6662). The outer layers are connected with the binding posts of the D'ARSONVAL solenoids (Figs. G/6602 or G/6609). The apparatus having its parts thus related is ready for work and the circuit may be closed. The balls of the spark micrometer should be separated by an interval of $\frac{1}{8}$ to $\frac{1}{2}$ in. The current is regulated by means of the spark micrometer. The strength of the current in the solenoid is determined by the bright or dull appearance of an incandescent lamp fastened to the spiral. The smaller solenoids for the treatment of the arm or abdomen are connected in a similar manner.

Séances should take place daily and should last from 3 to 10 minutes, according to the feelings of the patient. If dyspnoea or fatigue should be apparent the séance should be terminated at once.

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TREATMENT BY MEANS OF THE APOSTOLI CONDENSOR-BED.

In this case the small solenoid (Fig. G/6625) should be connected with the Leyden jars. One end of the solenoid should be connected with the metal plate which is under the bed, the other with the cylinder electrode (Fig. G/6633), which the patient holds in his hand. The current is regulated by increasing or diminishing the spark gap of the micrometer and by modifying the current which is introduced into the spark inductor. The séances should be had daily.

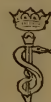
DIRECT POLAR TREATMENT.

There should be two or three séances a week, and they should not last more than 10 minutes each.

TREATMENT BY OUDIN'S METHOD.

If the induction coil is properly set up there will only be required two well-insulated wires leading from the binding posts of the secondary spool of the coil to the spark micrometer, for the other portion of the apparatus is arranged with the Resonator upon a common lower plate as per Fig. G/6644 and others. If the zinc balls are separated by an interval of about $\frac{3}{4}$ in. the Resonator will be ready for work. If it is desired to obtain the maximum activity of the Resonator one end of the movable attachment must be connected to one end of the small solenoid while the other end is dropped to the ground. If the circuit of the

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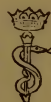
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induction apparatus has been closed the spark micrometer must be so placed that the upper end of the Resonator will give out the greatest amount of spray possible. In adjusting the spark micrometer the metallic portions must not be brought into too close approximation, for in that case unpleasant shocks might be felt. The tension in the circuit produced by the spark inducer and the inner coating of the Leyden jars is not advantageous to the body.

Quite different are the physiological effects produced by currents of decidedly higher tension which proceed from the Resonator. The sparks from such currents as they come in contact with any portion of the body, the hand for example, cause only a prickling sensation, and are, moreover, without dangerous properties. The tension of the currents produced by the Resonator is so high that it even has the static properties of an influence machine and gives out rays of light. In order to utilize these manifestations of energy for therapeutic purposes an electrode is attached by means of a flexible conducting cord to the contact post on the upper portion of the hard rubber pillar of the Resonator and the rays of light allowed to impinge upon that portion of the surface of the body which is to receive treatment. The brush or the pointed electrode is held at some distance from the body, but the condensor electrodes are brought in contact with the skin. The application of the current is then regulated by changing the point of attachment of the Resonator to the solenoid by means of the movable connection. In using the apparatus depicted in Fig. G/6644 the current is regulated by moving the vertical spiral to the proper extent with the peg which is attached to it for that purpose. This method of treatment is applicable for diseases of the skin and mucous membrane, and especially for trophic disorders of the skin of nervous origin. The séances should be held two or three times a week, and should not exceed 10 minutes in duration.

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APPARATUS
FOR THE TREATMENT WITH
HEAT AND LIGHT
RAYS.

THE KNY-SCHEERER COMPANY, NEW YORK.

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LIGHT AS A THERAPEUTIC AGENCY.

INTRODUCTORY REMARKS.

For the relief of those morbid conditions in which the aid of surgery is not invoked the present tendency is *away from drugs*.

For some of the diseases which are distinctly surgical, the tendency is *away from the knife*.

In an age in which the development and utilization of physical forces are immeasurably greater than ever before, it is not strange that human effort should endeavor to turn therapeutics into the same channel in which so many other departments of human activity have been turned and to reduce it to a problem which is to be solved by the application of the exuberant forces in nature. *Heat, light, electricity, an illimitable reservoir to draw upon!*

With all the wonderful achievements thus far, the imagination pictures the future which will transcend and outshine them. A glance backward into the recent past reminds one of the freshness and closeness of contact with us of many of the most important and indispensable applications of these natural forces.

It is only day before yesterday that it was ascertained that many opaque bodies are entirely pervious to light.

It is only yesterday that it was realized that curative power to a remarkable degree resides in rays of light, and more wonderful still, and paradoxical, in rays which are invisible.

It is true that the rays which pass through blue glass were believed by many to have healing properties years ago, but not until the solar spectrum was more perfectly analyzed was there an intimation, based upon scientific foundation, of the extent to which these properties could be utilized.

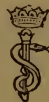
That a beam of light should also exert heat is an observation which is as old as human thought, that it should have powerful chemical properties is a discovery of modern science.

That it should act upon life and growth, both vegetable and animal largely by means of invisible elements is another illustration that the mightiest force is that which is silent and unseen.

There are invisible rays at both ends of the spectrum; those which are beyond the red are heat rays, those which are beyond the violet are chemical and stimulate the development of chlorophyl in plants and hæmoglobin in the blood of animals, by increasing the oxidation processes in the cells.

The composition of the spectrum of light is practically the same whether its source be the sun or an artificial source. This is a most important fact in connection with the therapeutic use of light, for sunlight is not always available. The electric light, both the incandescent and the arc, therefore, finds an extensive field of use in light therapy, and it has even been found preferable to sunlight, in some instances, as a therapeutic agent, since it contains a relatively greater number of ultraviolet or chemical rays than does sunlight, at least this is affirmed of the arc light.

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EFFECT OF LIGHT UPON BACTERIA.

The influence of light upon bacteria is positive and destructive.

KOCH was perhaps the first, or among the first, to recognize this influence, in his observation that cultures of tubercle bacilli were destroyed by sunlight.

Some years later FINSEN discovered that the ultra-violet rays would destroy the tubercle bacilli in lupus of the face, and that healing with little or no scarring would follow its continued use. This observation may be considered the foundation of phototherapy.

Other investigators observed that the growth of the typhoid bacillus was inhibited, and that the bacillus of plague was killed by the same agency.

All investigators, so far as we are aware, concur in the fact that bacteria in general do not thrive in sunlight, and this at once gives us a fundamental platform for the utilization of light as a therapeutic agent.

EFFECT OF LIGHT UPON THE BODY.

It is to state the most elementary truth to say that light is absolutely essential to life, that animals and plants instinctively prefer light to darkness. The plant turns its face to the sun and away from the shadow; the flower closes its lids as the darkness comes on.

Animals, including man, which have the best development, live chiefly in the light, they apparently find enjoyment as well as advantage in bathing in the sunlight. One who has become debilitated by work in a shop, a factory, a mine, or in any place in which the light is defective at once improves when he begins to live out of doors, in the sunlight.

Thousands of tuberculous sufferers have found life and health by prolonged exposure to air and sunlight.

The therapy of light is therefore rational and natural.

KELLOGG, of Michigan, in 1894 constructed a cabinet fitted with incandescent lamps to be used as a light bath for the treatment of certain diseases, chiefly by means of the profuse perspiration which was caused by the heat.

In all forms of similar apparatus which are illuminated by this variety of light perspiration seems to be the end chiefly sought.

WINTERNITZ, the apostle of hydrotherapy and diaphoresis, declared that he now procures sweating solely by means of the light bath.

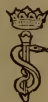
FRIEDLAENDER, in 1896, suggested the use of the electric arc light as a therapeutic agent. Owing to its richness in actinic rays (blue, violet and ultra-violet) this light will produce anæsthesia and chemical effects upon the skin and underlying tissues and organs, stimulate metabolism, and produce a certain degree of irritation of the peripheral nerves.

FINSEN, in 1898, treated variola with red light and found that patients who were thus treated recovered without scarring and pitting.

His enthusiasm for phototherapy became commensurate with his success, he systematized this method of treatment and received the assistance and co-operation of the Danish government in the elaboration of his plans, and the development of the scope of his system.

He and others who have wrought along similar lines found that light could be used apart from heat, the heat rays being eliminated with screens, lenses, running water, etc., and that cold light was frequently as effective as a therapeutic agent as light from which the heat

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had not been abstracted. It was also determined experimentally that light will penetrate and even pass through the body, certain rays being absorbed by the tissues and others passing through and out. The more transparent to light the upper layers of tissue the more intense the effect on the deeper layers, but it seems to have been proven that all the internal organs are accessible to the influence of light, especially to the actinic rays (blue, violet and ultra-violet.) *The term actino-therapy refers consequently to the chemical changes which are produced by these rays.*

A combination of the incandescent and the arc lights is often very desirable especially if perspiration is the end which is principally desired from the bath.

An antiseptic effect is noteworthy in the use of phototherapy. This is seen in the rapidity with which wounds heal under its influence. This may be considered a corollary to the observation that light is destructive to bacterial life.

The light bath may be general, all portions of the body being exposed to it, or it may be general and local, rays of light from a special source being directed upon a diseased surface or part, or it may be local and directed entirely to the portion of the body which it may be desirable to influence.

APPLICATION OF LIGHT TO PARTICULAR FORMS OF DISEASE.

Numerous sanatoria for the treatment of disease by means of apparatus in which light is the therapeutic agent have been established in various parts of the world. The FINSSEN institution at Copenhagen is most widely known and most comprehensive in the scope of its work.

Apparatus by means of which light-baths may be administered also forms a portion of the plant in many Turkish and Russian bathing establishments, hospitals, sanatoria, water-cures, etc.

BREIGER, who has a sanatorium at Osterode, Germany, states that the best results which he has obtained have been through the medium of profuse diaphoresis. He sometimes obtains a temperature of 176° F. within the bath cabinet. When it reaches 158° F. he applies cold compresses to the head, and even with so great an elevation of temperature he has seen but one case in which there was unfavorable reaction. His most successful cases were those in which there was acute myalgia, or chronic rheumatism. For such conditions it is probable that heat and moisture will always remain the most effective means of treatment. Next in order of success were cases of neurasthenia and gout.

He uses a cabinet furnished with both the incandescent and the arc light assisted by illumination from without the cabinet when this is desired, the light thus introduced into the cabinet being concentrated upon some particular part or surface which requires such local treatment.

A course of treatment for a chronic disease like rheumatism usually occupied, with BREIGER, six or eight weeks, with three treatments of half an hour to an hour each per week. The combined (incandescent and arc) light was used in all cases, and in the intervals between the baths the parts which were particularly diseased were subjected to local illumination.

One of the most important applications of light therapy is to diseases of the skin. Its usefulness in this field suggested itself to FINSSEN in consequence of the success which attended

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his treatment of variola with red light, and the equally brilliant results with the ultra-violet rays in the treatment of lupus.

This aspect of the subject has received more or less attention in this country and has found particular advocacy at the hands of GOTTHEIL, of New York.

The skin diseases which have been successfully combated with phototherapy, as mentioned by GOTTHEIL and others, in addition to lupus, are pruritus, psoriasis, epithelioma, acne vulgaris, acne rosacea, dermatitis, pityriasis versicolor, nævus, alopecia areata, eczema, ring-worm, contagious impetigo, and various forms of syphilitic and other ulcerations.

GOTTHEIL has used in his practice a specially constructed apparatus, in which intensity of actinic light is a characteristic.

He has also found the treatment absolutely painless and effective, and free from the radio-dermatitis, the ulceration or the loss of hair which often attend phototherapy by means of the Roentgen rays.

The use of light in the treatment of internal diseases has not as yet been extensively practised. That it may be made to penetrate the body and its chemical rays be absorbed by the organs of the body, seems to have been demonstrated. It must, therefore, have a useful future, and especially in those diseases in which bacteria form an etiological factor, for it has already been stated that bacteria in general succumb to the influence of light.

WILLIAMS, of Richmond, Va., has had satisfactory results with the arc light bath in cases of locomotor ataxia, chronic rheumatism, neurasthenia and anæmia.

He has also had some experience with pulmonary tuberculosis which makes him very hopeful as to the influence of light upon this disease.

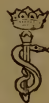
FREUDENTHAL, of New York, has had interesting experience in the application of light to the treatment of diseases of the respiratory organs. He applies the arc light to the larynx for the relief of the pain and dysphagia associated with tuberculosis, and in some cases has succeeded in giving relief when all other conceivable means had failed. He has also used it for pulmonary tuberculosis and while he is not over sanguine as to its curative effect, especially in advanced cases, he believes it is at least a very useful adjuvant to other means of treatment. He observed that the high temperature of pulmonary phthisis was reduced by its use and expectoration was facilitated, there was also an improvement in metabolism, and increase in the appetite, less tendency to sleeplessness, relief of pain, etc.

Hay fever has also been treated by FREUDENTHAL with success by means of light, the rays being directed upon the face or chest through a blue glass screen. Of twenty-four patients whom he treated for this disease fourteen were decidedly benefited, the discharge from the nose, the asthma, and the sneezing being relieved after the first exposure to light.

Phototherapy will find a large field of usefulness in cases of prolonged constitutional disturbance, cases in which there is not so great an indication for treatment with drugs as for hygienic treatment. These are the cases which are benefited by Russian and Turkish baths, by water and climate cures, by regulated diet and regular habits. They occur most frequently in individuals of middle or advanced life, in those who have been dissipated or overworked and who are sufferers from chronic nephritis, chronic diseases of the liver or spleen, obesity, syphilis, neurasthenia, diabetes, rheumatism and gout.

It will consequently be found more and more that it will be advantageous for the managers of establishments and sanatoria where such diseases are treated to familiarize themselves with the principles which relate to phototherapy and to supply themselves with the necessary apparatus.

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LIGHT IN THE HEALING ART.

The following extract of STREBEL'S excellent paper is probably as good a resumé as exists of the principles which relate to phototherapy, and of its present status from the practical standpoint.

Right and left from the seven primary visible colors of the solar spectrum produced by ether vibrations of varying kinds there are present additional vibrations, invisible but demonstrable by suitable means.

Those which are beyond the red bands of the spectrum are the ultra-red or heat rays; those beyond the violet, which act chemically, are the ultra-violet rays, by the action of which photography becomes possible.

We have long known of the utility of the ultra-red in relation to the life of plants and animals; we now know something of the utility which is even greater, in some respects, of the ultra-violet, the violet and the blue rays.

Studies of *spectrum* have shown that every color and every kind of ray, whether it implies heat, color or chemical effect exercises its own peculiar effect which is manifested by the degree to which it accelerates, retards or destroys life. The sun as a source of light cannot always be depended upon, hence it has been found necessary to utilize the incandescent and arc lights as a substitute. The arc light is even superior to sunlight in some respects, especially since it furnishes an abundance of the ultra-violet and blue rays which may be deficient in the sunlight under certain very common atmospheric conditions of cold and moisture. This peculiarity of the arc light was discovered by W. SIEMENS, in 1880, who also demonstrated that it favored the growth of plants, excited the formation of chlorophyl and hastened the ripening of fruit by many weeks, while also improving its size and flavor. Other investigators have determined that sunlight or its substitute, electric light, exercises a powerful and inimitable influence upon the growth and health of animals and men. It possesses the power of penetrating the skin and underlying tissues, illuminating them, and by its conversion into chemical and electrical irritating force it greatly modifies local and general metabolism, increasing the absorption of oxygen and the elimination of CO₂.

It has also been demonstrated that light is the best, the most convenient, and the most certain means of destroying bacteria. Sunlight destroys within an hour's exposure the poisonous bacteria in the dust of houses and streets, and floating in the atmosphere. The so-called self-purification of flowing streams is accomplished by means of sunlight, which effects this end by the formation of peroxide of hydrogen.

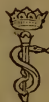
Tubercle bacilli, plague bacilli, splenic fever spores, tetanus germs, etc., are all promptly destroyed by exposure to sunlight or the electric light.

The ultra-violet and blue rays are most destructive in their action upon bacteria, while the red rays have no such effect.

The destructive effect of light upon bacteria may be increased by placing plates of blue glass in front of the source of light, the ineffective red and yellow rays being thus shut off.

It has further been shown that under the influence of either sunlight or electric light there is a decided increase in the number of red corpuscles of the blood, the effect being analogous to the increase of chlorophyl in plants under similar influence. This means an increase in the hæmaglobin, which in itself constitutes a means of improvement in many forms of disease.

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Light also will cause local or general perspiration which, if the light and heat rays are combined, may be very profuse. The perspiration in such cases is directly due to the action of the light and heat rays, and not to the gradual introduction of heat into the body such as happens, for example, in a steam bath.

The light rays themselves penetrate the tissues and excite tissue changes which result in elevation of temperature.

By this activity together with the profuse discharge from the sweat glands, an energetic combustion is produced of the poisons resulting from the breaking up of the proteids, and the performance of the other normal functions of the body.

With increased activity in the skin and respiratory organs these poisons are quickly eliminated.

It must be again observed that the perspiration in such cases is not the indirect result of pressure from within, but is caused directly by the action of light, the heat action having no share in this operation.

The removal of poisonous material from the body consists not alone in the elimination of disintegrated material, but in the actual removal of bacteria with the perspiration *and this is effectively accomplished by the light baths.*

The following experiments demonstrate that light acts destructively upon bacteria which are located deeply in the tissues of the internal organs.

Several dogs were inoculated with tubercle bacilli, and half of them were placed in a dark room while the other half were placed in an electric light cabinet. The former died in a few days, the latter were killed on the thirteenth day, and showed on autopsy the favorable effect of the light treatment. Other dogs were inoculated with diphtheria bacilli, some being placed in a dark room and others in the electric light cabinet. Those which were in the dark room died on the fourth day, the others were still living on the seventeenth day.

In other inoculation experiments with other poisons the light treatment showed equally favorable results

FINSEN observed that in the treatment of smallpox, those cases which were exposed to white light sometimes resulted unfavorably while those that were exposed to red light recovered without suppurations and cicatrization.

In some of the other skin diseases it was also observed that ordinary daylight had an unfavorable effect in some cases while colored light which excluded the harmful rays acted favorably.

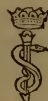
Thus the physician has in light an agency which may be of great service as a means of curing disease.

The general light bath which exposes the entire body is the form which should be used. The apparatus for the purpose is a cabinet finished with enamel paint, in which the body of the patient is enclosed while the head is outside. In one cabinet of this description are a number of sixteen candle power incandescent lamps, while another variety has in addition two or more arc lights with light up to ten thousand candle power, which radiate their light upon the body from all sides. Colored glass reflectors may be used if desired. By the use of proper electrodes a light may be obtained which is fully equal in photochemical activity to sunlight and enormously destructive to bacteria.

The electric light has the advantage over sunlight in being obtainable at any time in any desired volume.

The temperature of the cabinet may be regulated by increasing or diminishing the number of electric lights.

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Another form of treatment consists in exposing a single portion of the body to white or colored light, with or without heat, by means of mirrors and lenses. The deep tissues may thus be so illuminated that the blood vessels will stand out as distinct shadows.

A third method consists in a combination of local and general exposure. The patient sits in the light bath while beams of light are also projected through openings in the wall of the cabinet upon the part or tissue which is the seat of the disease.

In this way general improvement in tissue metamorphosis is effected together with direct action upon the local condition. Such treatment does not interfere with the simultaneous local or general use of suitable medicinal substances; on the contrary their effectiveness will only be increased by it.

It is harmless and painless and even in the presence of heart lesions it may often be employed with advantage to the heart action.

Among the diseases in which the light treatment has been found beneficial may be mentioned the following:

- Rheumatism,
- Gout,
- Neurasthenia and Hysteria,
- Obesity,
- Asthma,
- Chronic Inflammation of the Urethra,
- Heart Weakness,
- Fatty Degeneration of the Heart,
- Bronchial Catarrh and Emphysema,
- Neuralgia,
- Tumors of the Lower Portion of the Thigh,
- Chronic Gastro-Intestinal Catarrh,
- Affections of the Knee-joint.
- Anæmia,
- Diabetes,
- Headache,
- Chronic Diseases of the Skin.

These conditions are for the most part chronic in character, accompanied with pain and great discomfort, and in most cases are materially relieved or cured by the light treatment.

Lupus or tuberculosis of the skin is a conspicuous example of a severe and disfiguring disease which yields completely to the form of treatment here advocated.

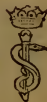
It has also proven very efficient in curing tumors of a malignant character and in promoting the rapid healing of wounds, almost without a scar.

In obesity has been seen a reduction in weight of forty-five pounds within a short period, without limitation of the diet and without bad results.

In diabetes which had existed for years, the combined use of light and internal medication effected a reduction of the sugar discharged with the urine from six per cent. to one per cent. in a very short time.

For those who are anæmic and of pale countenance it is advised that they do not swathe themselves in thick and heavy clothing and bury themselves in a warm corner, but wear clothing that is light and permeable to air and sunlight in order that the skin may receive their beneficent influence.

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This condition is often the forerunner of pulmonary phthisis and light is one of the agencies which may prevent it. If tuberculosis is actually present the influence of light upon the tubercle bacilli will be most potent for their destruction. That the interior of the chest can be illuminated and the diseased lung tissues directly exposed to the action of light can be easily deduced from the simple experiment of holding the back of the hand in front of a strong artificial light. The hand becomes transparent, the shadow of an object placed behind it, for example a lead pencil, can be plainly seen, and the shadows of the large blood vessels in the palm of the hand become distinctly outlined.

It is advisable, however, to caution against too great optimism concerning the direct experience of DE RENZI and others. The action of light upon tubercle bacilli in a test tube is a different matter from its action in the interior of the body. The experience of consumptives who have been kept in the open air has indeed been favorable and encouraging, and this will be the case to a much greater degree when the importance of light and sunshine for such patients is fully realized, not only when they are in sanatoria devoted to the treatment of disease but also when they are in their own homes.

It is a matter of importance, however, that the action of light upon the tubercle bacilli which are present in lupus or tuberculosis of the skin is definite and incontrovertible, and gives weight to the argument in favor of light treatment for internal tuberculosis. The destruction of tubercle bacilli in the skin under the influence of light is followed by complete healing of the skin with no cicatrization in addition to that which existed prior to the commencement of treatment.

Light therapy has also proven of great value in the treatment of disease of the sexual organs. Particularly is it useful for syphilis and its sequels in combination with appropriate internal remedies.

An interesting clinical fact is that in a case of syphilis which was subjected to light treatment, the perspiration contained mercury. Its persistence within the skin was remarkable, for ten years had elapsed since mercurial treatment had been employed. Lead and sulphur are also retained in the skin a long time and may also be removed with the perspiration which accompanies the light cure.

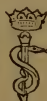
The inference is reasonable that smaller doses of these substances will be required if they are combined with light baths.

The light treatment has also been invoked for the relief of gonorrhœal discharge from the urethra. The light is introduced through the appropriate tubes into the urethra, without pain to the patient and in a short time destroys the bacteria, which are the cause of the inflammation. It is also useful for chronic catarrh of the urethra, and has succeeded in the course of a few treatments in relieving conditions which have existed for years. The action in such cases is less that of a bactericide than of an exciter of acute inflammation which when it subsides includes the subsidence of the pre-existing inflammation.

This method of treatment *is not advocated as a cure-all*. It does not do away with other means of treatment and it will give better results when judiciously combined with suitable medicines and diet regulations, especially in such chronic diseases as pulmonary phthisis and diabetes.

The bactericidal influence of light from the induction spark is a new and original method for the use of light, to which particular attention should be drawn. The spark from the induction coil is very rich in ultra-violet rays which, as has already been shown, are of the greatest significance in light therapy. If the light from this spark is passed through a lens of rock crystal, which readily permits such passage, it may be directed together with its in-

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visible ultra-violet rays upon any desired object, just as the rays of the sun are collected upon a burning glass and directed at will. If now the collected light from the spark is directed to one of the sides of a rock crystal prism the bluish white light will be broken up into the seven colors of the spectrum which can be intercepted as a broad band of color of definite length upon a piece of white paper with the red at one end and the violet blue at the other. If, instead of white paper, the light is intercepted with a screen varnished with a phosphorescent substance, one will still see the spectrum from red to violet, but in addition, beyond the violet, a clear luminous band which consists of the ultra-violet rays made visible by the luminous properties of the screen. This luminous band is decidedly larger than the usual colored spectrum, and one can infer from this the great richness of the induction light in invisible rays which have been made visible in this roundabout way. It is the chemical force of the ultra-violet rays which is chiefly concerned in the destructive action of light upon bacteria.

Taking advantage of the abundance of these rays in the induction light and projecting them upon various artificial cultures of bacteria, it will be noticed that in a few minutes they will be completely destroyed. The cultures included are tubercle, diphtheria, and splenic fever, bacilli, pus bacteria and others of harmless character.

The practical advantages of destroying bacteria by this method compared with those which have heretofore been used are that a smaller volume of the electric current will be required, the manipulation of the apparatus is easier, and the patient suffers no pain because the beam of light which is emitted is actually cold. The electrodes for this purpose are small hard rubber tubes closed with a quartz lens, the light being concentrated. The apparatus is so secured to the part to be treated that the skin is made anæmic owing to the absorption of the ultra-violet rays by the blood.

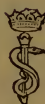
The influence of light therapy upon diseases of the hair and scalp is very remarkable. FINSEN reports forty cases of alopecia areata treated with concentrated light. Almost all of them were cured in a very short time, the growth of the hair being resumed.

SABOURAUD has been similarly successful. Other parasitic diseases, psoriasis, herpes tonsurans, sycosis, and favus, which are ordinarily so obstinate and rebellious to treatment, have yielded to the influence of light, the parasites being promptly destroyed and the lesions which they have caused usually healing with little or no cicatrization.

The constant high tension light may also be conveyed into the cavities of the body by means of suitable sounds. Intense light can consequently be directed with as great efficiency into the interior of the body as to the local superficial mucous membranes, and can accomplish its bactericidal action. The male and female urethra, uterus, vagina, rectum, bladder, larynx, and ear cavities are all susceptible of approach by light-conducting instruments and the infectious processes by which they may have been attacked may be subjected to light therapy.



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G/7003

G/7003 Combination Incandescent and Arc Light Bath Cabinet. Code SAAVE

This is a hexagonal cabinet, 4 feet 3 inches in height, and 4 feet 6 inches in diameter. Body of structure is made of yellow pine wood. It has a door in front and hinged trap-door or lid cover at the top, which opens outwardly, thus being under the control of the occupant of the cabinet. The hinged trap-door at the top has an opening, which encloses the neck of the occupant, also two smaller holes, which enable the latter to reach out his hand and wipe the perspiration from his face, get a drink of water, etc.

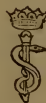
In each angle of the cabinet is a series of five incandescent lamps (larger number can be furnished to order), which, in addition to the eight lamps furnished with the bath cabinet chair, make a total of 38 16-candle-power lamps.

In addition to this series of incandescent lamps, the cabinet is provided with three arc lamps, which are detachable and so arranged that no detached pieces of burning carbon, accidentally dropping off, can come in contact with the occupant and injure him.

Colored glass shades can be furnished for placing in front of lamps if desired.

Apparatus complete with 38 incandescent globes and 3 arc lights
including Bath Cabinet Chair..... \$275.00

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G/7006 Incandescent Solar Light Bath Cabinet. This cabinet is exactly like Code SABA G/7003 in construction and finish. It is provided with the same number of incandescent globe lights 38 in number and with the same bath chair.

No arc lights are furnished with this apparatus. Profuse perspiration may be produced with this Solar Light Bath in very few minutes.

Apparatus complete w.th 38 incandescent globes including Bath Cabinet Chair..... **200.00**

N. B. The inside lining of these wooden cabinets is of white enameled steel sheeting which reflects the light as it impinges upon it the light being thus thrown upon the occupant's body from all sides. The heat rays are reflected by the white surface, whereas in the mirror lined cabinets, formerly in use, much of the heat was absorbed. The temperature in these cabinets can therefore be brought up to the desired limit much more rapidly than with mirror lined cabinets.

THE KNY-SCHEERER COMPANY'S. ASEPTIC SOLAR ELECTRIC LIGHT BATH CABINET.



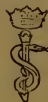
G/7010. Closed.

Consists of six drawn sheet steel panels, steel top with Openings for head and hands, steel bottom, metal chair, door at front and two doors in the top, as shown in illustrations.

The outside is handsomely finished in imitation of oak, and the interior white enameled, with water-proof cork mat in the bottom.

Thirty spherical incandescent lamps are arranged in six channels (Figs. 4 and 5), said channels being provided with blue or ruby glass screens, which are hinged to one side of the said channel and so arranged that they may be instantly interchanged and placed

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in front of the lamps within. Eight lamps are also arranged around the bottom of the chair. Each set of lamps are on independent circuits, and may be controlled separately by means of switches conveniently arranged on the underside of the top of the cabinet, by means of which the temperature within the cabinet may be closely regulated.

All wiring is of the latest approved style, enclosed in steel tubes, and such as approved by the New York Board of Fire Underwriters. The wiring is so arranged that the cabinet may be operated on 52 or 104 volt alternating current; 110 or 220 direct current; it merely being necessary to insert lamps of the equivalent voltage.

The simplicity of the construction of this cabinet is such that it can be set up in a few moments by anyone following the directions.

The channels carrying the lamps are supported on hooks at their back and the lamps therein connect to junction boxes on the underside of the top of the cabinet by means of plug switches. The panels are held in place by small clamps, which also serve as a support for said lamp channels.



G/7010. Open.

To facilitate shipment and simplify the installation of the cabinet by a novice, it is so constructed that it may be entirely taken apart without interfering with any of the electrical connections or other parts.

This is accomplished by removing the plug switches at the top of the channels; lifting the top off; raising the channels from their hook supports; removing the screws in the clamps, holding panels together, and withdrawing the two hinge pins, and vice-versa, for setting up.

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The advantages which this new construction offers over the old form are very striking. It can be compactly packed and shipped, being easily taken apart, thus saving freight and lessening the risk of breakage during transportation. The difficulty so often met with that a cabinet could not be gotten through doors of usual width in living apartments has been entirely overcome.

Its construction being entirely of non-absorbent material, it will not harbor offensive odors inseparable from perspiration; besides, it can be thoroughly disinfected and flushed with water. It will not warp, which wooden cabinets always will do.

It is absolutely fire-proof and the steel panels being jacketed will effectively act as insulators.

Our illustrations only represent the Aseptic incandescent Solar Bath. We furnish the combination incandescent and arc light bath in the same construction.

G/7010 The Kny-Scheerer Co.'s Aseptic Solar Electric Light Bath Cabinet.
Code SACCA Price for apparatus complete..... \$225.00

G/7012 The Kny-Scheerer Co.'s Combination Aseptic Solar Incandescent and Arc Light Bath. In construction exactly like G/7010, but in addition to Incandescent globes are furnished three detachable Arc lights of high candle power.
Code SABIN Price for apparatus complete ... 300.00

G/7022 Reclining Light Bath.
Code SACHA

In certain diseased conditions it is not practicable for the patient to use the cabinet for phototherapeutic purposes. For those whose limbs are drawn up by gout or rheumatism, for those who are anæmic and who may have attacks of fainting while sitting, the reclining position is preferable.

The apparatus for giving the reclining bath is a rectangular box, six feet eight inches long, and two feet eight inches wide. It is fitted with cane matting, which can be washed, and over this is a cloth of light net-like texture, which can be sterilized by boiling.

In the interior of the box, below the cane matting is a trough-shaped reflector of white enameled steel. In front of this the lamps are so arranged that their light will fall on the patient who lies on the cane seat. The reflector should be washed after each treatment.

The cover or lid of the apparatus is also trough-shaped and lined with enameled steel, and is attached to the other portion by hinges. It also contains a series of incandescent lamps. At one end there is an opening through which the patient's head passes, and at the other end an opening or valve through which the arc light may be introduced, if it should be desirable to use both forms of light.

Details and Prices mailed upon application.

PORTABLE ELECTRIC LIGHT BATH TENTS.

For the convenience of physicians and patients desirous of securing an electric light bath, but who, on account of not having at their disposal the requisite space for installing one of the Solar Light Bath Cabinets described under Nos. G/7003, 7006, 7010 and 7012, we are manufacturing a dismountable and portable light bath tent which can readily be set up for use and thereafter be dismounted and stored away compactly.

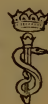
The arrangement consists of four upright steel posts, white enameled, each being provided with eight or ten incandescent lights. The individual sets of light may be controlled separately by means of switches mounted upon these posts.

From a metal rail, connecting the uprights, is suspended a screen of heavy linen entirely surrounding the cabinet.

The patient enters the light bath tent wrapped in a poncho-like gown made of the same material, and after seating himself upon the bath chair, spreads the sheet over the top of the tent.

Of the electric light bath tents one may choose three different patterns.

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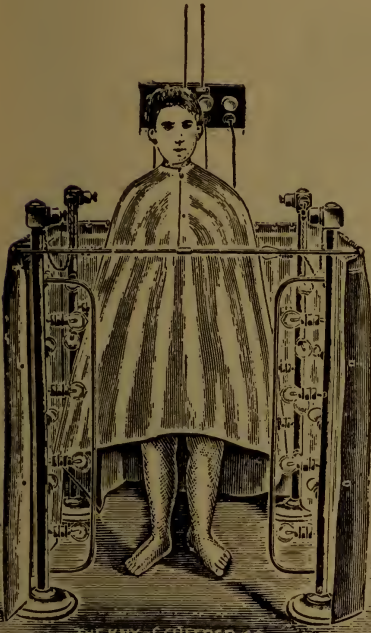


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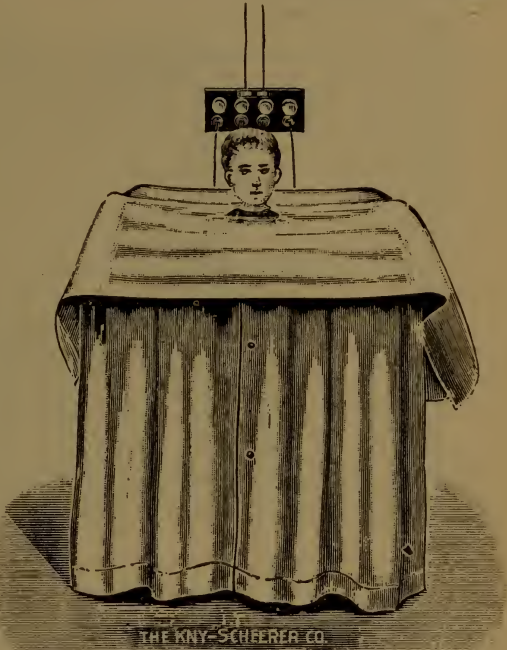
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G/7040



G/7040

- | | | |
|----------------|--|-----------------|
| G/7040 | Electric Light Bath Tent , provided with 32 incandescent globes. For temperatures up to 120° Fahrenheit (50° Celsius). Complete with screen and <i>poncho</i> but without chair..... | \$125.00 |
| Code SACRA | | |
| G/7042* | Electric Light Bath Tent , provided with 40 incandescent globes. For temperatures up to 140° Fahrenheit (60° Celsius). Complete with screen and <i>poncho</i> but without chair..... | 150.00 |
| Code SADOW | | |
| G/7046 | Electric Light Bath Tent , provided with 32 incandescent globes and 3 ARC Lights. For temperatures up to 140° Fahrenheit (60° Celsius). Complete with screen and <i>poncho</i> but without chair..... | 225.00 |
| Code SAGAN | | |

EXTRA PARTS.

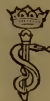
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|---------------|--|-------------|
| G/7049 | Screen for enclosing light bath tent , made of heavy home spun linen..... | 7.50 |
| Code SAIDA | | |
| G/7050 | Poncho-Gown , made of heavy home spun linen..... | 6.00 |
| Code SALAD | | |

REMARKS.

The luminous efficiency of an incandescent lamp is not more than one-third that of the electric arc, and, while poor in blue, indigo and violet frequencies, it is rich in green, yellow and red frequencies.

Both the chemical and the luminous efficiency may be increased by increasing the current. Therefore, where the most intense effect is desired from the concentrated energy of incandescent lamps, the higher candle power should be used. For example, the 32 candle power will give out more of the valuable blue violet frequencies than the 16 candle power bulb, while a 50 candle power will produce a still more powerful effect.

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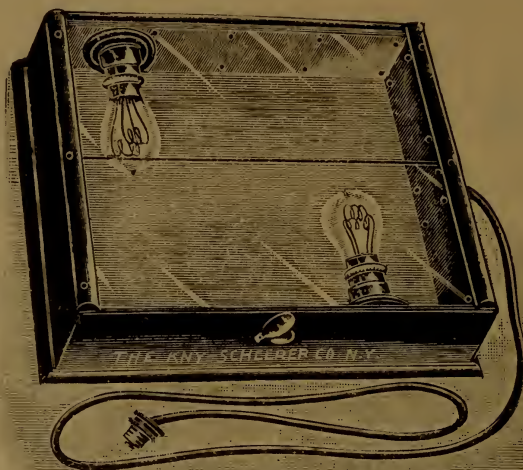


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G/7075

G/7075 Electric Foot Warmer and Illuminator, This apparatus is a convenient accessory for Electric Light Bath Cabinets. It consists of a box containing 2 incandescent lamps the top covered by a piece of plate glass.

Complete with 12 feet of cable including socket..... \$15.00

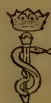
Apparatus for Concentrating Energy of Incandescent Light Spectra upon certain Parts of the Body.

For this purpose partial baths of incandescent light are used. The arrangement of the particular mechanism depends upon the anatomical locality to be treated. These local baths are more useful in many cases than the general bath as they may be carried to the bedside of the bed ridden patient and the chronic invalid unable to come to the physicians' office for treatment. Their use should, however, be always directed and supervised by the physician himself.

Applications of concentrated incandescent light energy can be made at a higher temperature than that of the general incandescent bath which is often desirable. While a general bath becomes unpleasant to many patients when the temperature reaches 125° Fahrenheit, in the localized administration of concentrated incandescent light energy as high a temperature as 212° F. can be readily borne, especially at the second or third exposure. Perspiration is not produced by this concentration of light upon a part of the body save at the high temperatures of from 190° to 212° F when generally it is very profuse.

There is always produced by one exposure of the extremities a sympathetic rise in temperature of the whole body as well as in the part treated.

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G/7087

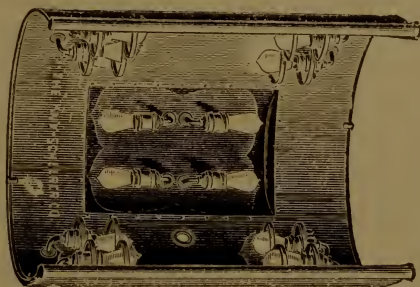
G/7087 Local Incandescent Light Bath for the Treatment of Chest and Body.

Code SALZA

The apparatus is made of bent wood, lined on the inside with steel, white enameled. It may be applied while patient is in reclining position. Its substantial construction makes it particularly desirable for Hospital use.

DIMENSIONS: Length 54 in. Width inside 32 in. Width over arc 18 in.

Price for Apparatus complete with 12 incandescent lights..... \$65.00



G/7090

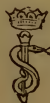
G/7090 Local Incandescent Light Bath for Treatment of Chest and Body.

Code SAURE

The apparatus described under this number and Figs. G/7093 and G/7094 consist of a bent metal frame in the concavity of which are placed a series of incandescent lamps of varying candle power according to the degree of light intensity desired. The lamps are protected by metal hoops making it impossible for the patient to come in contact with them. The outside is covered with suitable material, and the inside with white prepared leather cloth which can be readily washed and disinfected.

Price for apparatus complete with 12 incandescent lamps..... 60.00

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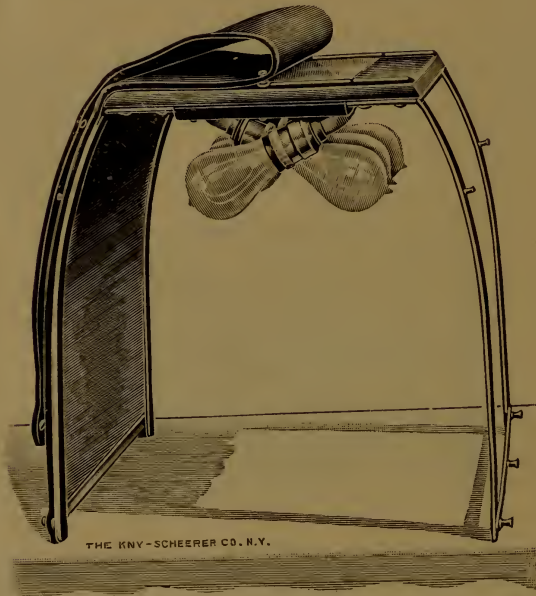
Telegraphic Address: EXRAY-NEW-YORK.



G/7093

G/7093 Local Incandescent Light Bath for the Treatment of Extremities,
Code SCIRO construction same as described under Fig. G/7090, arranged for 8
incandescent lights.

Price for apparatus complete..... \$45.00

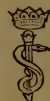


G/7094

G/7094 Local Incandescent Light Bath for the Treatment of Extremities,
Code SEDIL construction same as Fig. G/7090, arranged for 6 incandescent lights.

Price for apparatus complete..... 38.00

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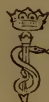
G/7100

G/7100 Combination Incandescent Light Bath Cabinet for the Treatment of Upper and Lower Extremities. The upper part can be detached, the bottom be provided with 4 legs thus serving as a stool for treatment.

Code SELBY

Price for apparatus complete..... \$75.00

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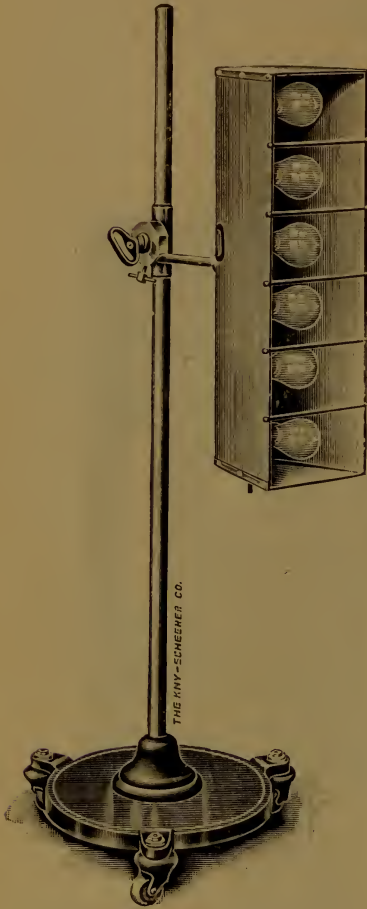


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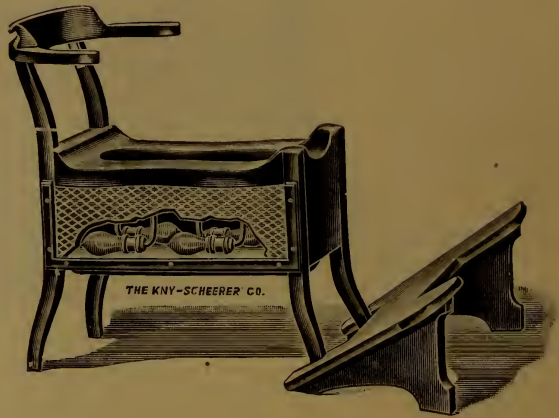
G/7106

G/7106 Local Incandescent Light Bath for Application of Light Energy to the Spine.

Code SENSA

The apparatus consists of a number of 6 incandescent lamps arranged in series and mounted in a metal box, the sides and ends of which approximate closely enough the surface of the back to insure a strict concentration of light energy. The patient is seated on an adjustable stool.

Price for apparatus complete. **\$35.00**



G/7115

G/7115 Local Incandescent Light Bath for the Treatment of Female Diseases.

Code SIERA

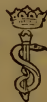
The apparatus is intended for directing the light from a series of incandescent lamps to the external genital organs and lower portion of the abdomen. The irradiation is indirect and is gentle and soothing.

The patient sits astride the seat which has a long central opening. Beneath the seat, which serves as a screen, is arranged a series of incandescent lamps, the light of which is reflected from the white trough shaped bottom of the bidet upon the patients' genitals and abdomen.

Price for apparatus complete

75.00

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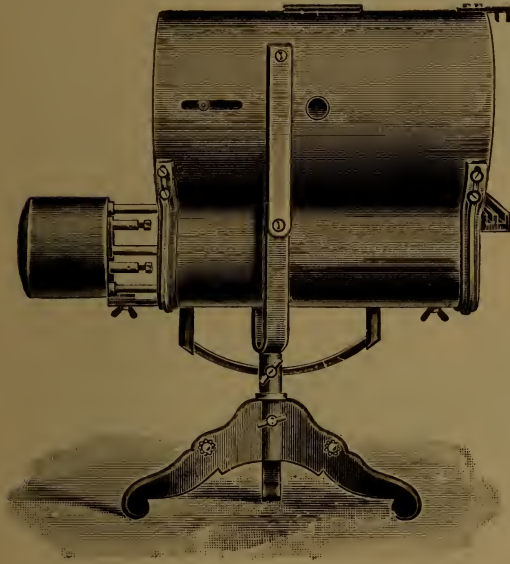
Telegraphic Address: EXRAY-NEW-YORK.

SEARCH LIGHT AND LIGHT PROJECTORS FOR LOCAL IRRADIATION.

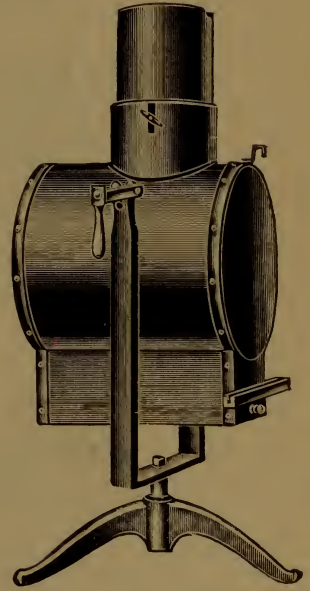
For General Application where large square inch surfaces are involved, as the chest in pulmonary tuberculosis, for example, projecting Arc lamps are successfully used. They are provided with reflecting mirrors, projecting the beam upon the patient's body at a distance of from 7 to 15 feet according to the light intensity. To eliminate the long and low frequency rays, a screen of blue glass see Fig. G/7280 may be placed between the patient and the source of light, whereby the thermal effect is minimized just to such an extent that a prolonged application can be born by the patient.

The ultra violet frequencies are cut off somewhat by the inter-position of such screens and the intensity of the chemical action is thereby diminished, but therapeutic results seem to warrant the conclusion that such diminution is not sufficient to interfere with the generally good results.

Following we quote an assortment of standard Apparatus constantly kept on hand. Special construction can be made to order at short notice at special prices.



G/7250



G/7252

G/7250 Light Projectors, for local irradiation arranged for **constant current**, with self-regulating carbons 10 to 30 Ampères. A parabolic reflector of 12 in. diameter, reflects the light which may be directed horizontally or vertically since the stand of apparatus is adjustable.

Code SIRM

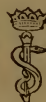
Price for the complete equipment..... \$60.00

G/7252 Light Projector, for local irradiation arranged for **alternating current**, with self-regulating carbons for 10 to 30 Ampères. Otherwise arranged like G/7250.

Code SIXTA

Price for the complete equipment..... 60.00

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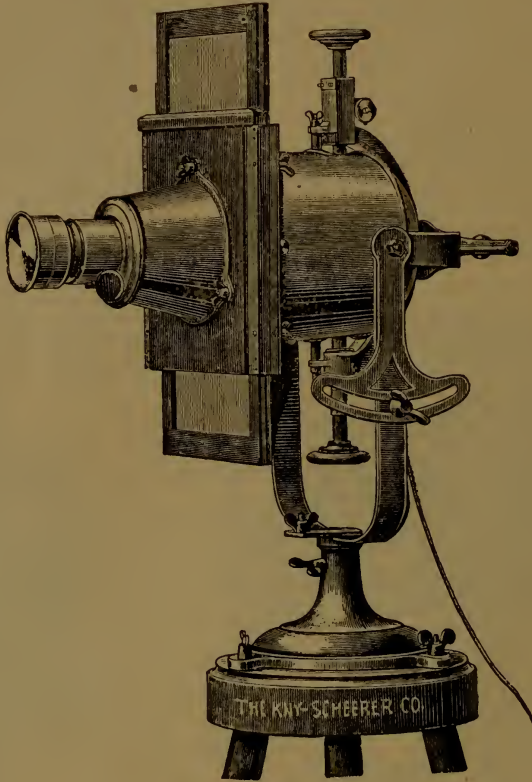


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G/7260

G/7260 Light Projector, for local irradiation by arc light, with objective for adjusting focal distances. Attachment for colored glass screens etc. Apparatus can be placed into any position and requires from 6 to 10 Ampères.

Code SIZIL

Price \$125.00

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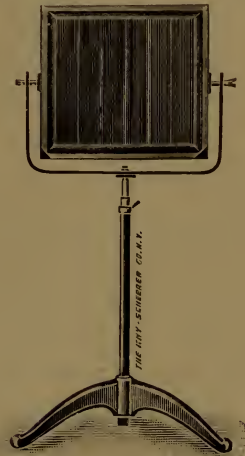


G/7265

G/7265 Therapeutic Arc Lamp, for direct
Code SK070 current 25 to 40 Ampères. with auto-
matic carbon feed. Perfect insulation of
jacket keeps apparatus entirely cool.

The front of hood is fitted with a Quartz
Lens A. On the back a reflector C. Appa-
ratus is adjustable to any direction.

Price.....\$65.00



G/7280

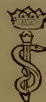
G/7280 Stand for receiving Colored Glass Screens. The heat generated by
Code SMEDE the Arc Light and more particularly when using high currents, is
very intense and although the colored glass employed in our screens is
specially tempered and hard, we recommend to place the screens at
some distance from the reflector. For this purpose we have con-
structed a special screen as shown in illustration.

Price,\$12 50

G/7290 Frames of Red Glass. For abovePrice each 2.00
Code SOB0E

G/7291 Frames of Blue Glass. For above.....Price each 2.00
Code SOCIA

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APPARATUS FOR CONCENTRATING ENERGY OF THE ELECTRIC ARC LIGHT IN SKIN DISEASES.

FINSEN is of the opinion that not more than 2% of the tubercular lupus cases can be regarded as incurable, and in the last report of his light institute he gives a resumé of 800 cases treated. In these 800 cases there was improvement in 90%, (cure in 70%, reappearance in 20%,) the latter being generally cases where the mucous membrane was involved.

The Apparatus which we are describing hereafter are constructed with the purpose in view to concentrate and to condense all the energies of the Arc by means of focal lenses.

FINSEN'S method consists in concentrating upon a small surface the light from a 50 to 100 ampère Arc Lamp, by means of an adjustable system of four rock crystal lenses, the apparatus being called a concentrator. Rock Crystal is requisite for the lenses because glass is not permeable for the ultra violet rays, which are the ones which are most efficacious in the treatment of disease. Fig. G/7378 shows an apparatus which is intended for the simultaneous treatment of four patients. The Arc Lamp and the four symmetrically arranged concentrators, around it together with the protective metal casing which covers it are suspended from the ceiling. For the completion of the apparatus a rheostat for controlling the resistance is required also, for each concentrator there must also be a pressure-glass which is composed of two plates of rock crystal, and has two tubes for the passage of a current of cold water.

This pressure glass is to be applied to the part of the body which is to receive treatment, and serves by its pressure to force away the blood from that part.

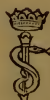
The divergent rays of the electric arc are collected into parallel rays by means of the telescopes and the parallel rays are then collected into a cone, the apex of which is directed upon that part of the body to be treated. The two telescoping cylinders contain each two plano convex lenses which are so proportioned that 1 and 2 have together a focal distance of 12 centimeters ($4\frac{3}{4}$ inches) while 3 and 4 have a focal distance of 10 cm. (4 inches).

Lenses 1 and 2 are nearest to the source of light and collect the divergent rays of the electric arc into a bundle of parallel rays while lenses 3 and 4 are converging these parallel rays upon the part of the body to be treated at a distance of about 10 centimeters (4 in.)

A water cooling arrangement by means of a continuous flow is provided for absorbing the thermal frequencies.

Direct 110 Volt current is preferable to alternating current since the latter is unsteady and therefore unsuitable.

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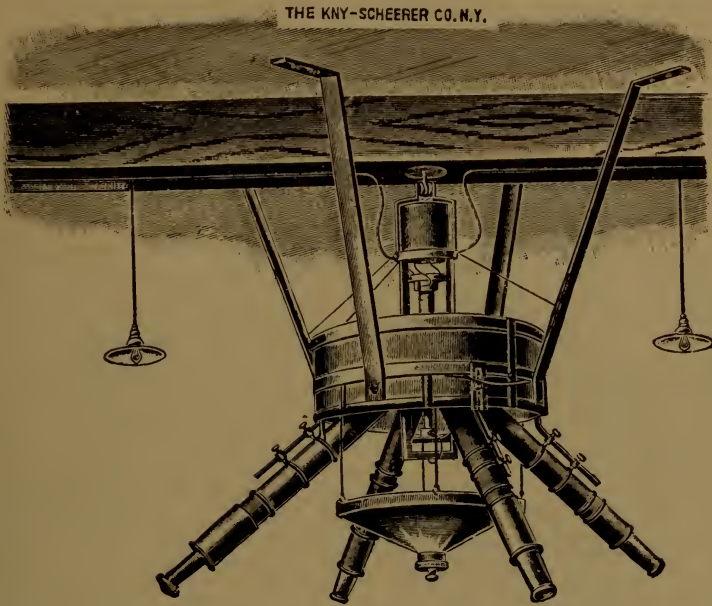


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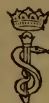
G/7378

PRICES FOR FINSEN'S APPARATUS FOR USE WITH 110 VOLT DIRECT CURRENT.

- G/7378 Finsen's Complete Apparatus** for the treatment of one patient consisting of
Code SPERO 1 Giant Arc Lamp, *Finsen's* special pattern for 50 to 100 amperes.
 Light Concentrator, *Finsen's* pattern with 4 rock crystal lenses.
 1 Arrangement for suspending Arc Lamp and concentrator.
 1 Sheet Metal Protection Mantle, jacketed, for water cooling.
 1 Pressure Glass with 2 rock crystal plates arranged for continuous water flow.
 1 Rheostat for Arc Lamp (50 ampères 110 volts).
 Price for complete outfit. \$500.00
- G/7380 Finsen's Complete Apparatus** for the simultaneous treatment of four
Code SPIKO patients consisting of 1 Giant Arc Lamp, *Finsen's* special pattern for
 50 to 100 amperes.
 4 Light concentrators, *Finsen's* pattern each with 4 Rock Crystals.
 1 Arrangement for suspending Arc Lamp and Concentrators.
 1 Sheet Metal Protection Mantle, jacketed for water cooling.
 4 Pressure Glasses, each with 2 Rock Crystal Plates arranged for
 continuous water flow.
 1 Rheostat for Arc Lamp, (50 ampères, 110 volts).
 Price for complete outfit. 1025.00

N. B.—Aside of the Finsen Light equipment as above illustrated, we manufacture a Metal Pedestal, with heavy foot, arranged for receiving the protection mantle, with water jacket and fittings for holding light concentrators. Water circulation takes place inside of the pedestal.
 This equipment can be furnished at an additional cost of \$50.00.

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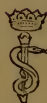
G/7388

G/7388 Finsen-Reyn Lamp is arranged for the treatment of a single patient. Code STAF A

The carbons are arranged perpendicularly as in the Finsen apparatus, and the system of lenses is strictly according to suggestion of the inventor at the Finsen Institute at Copenhagen. It differs from the original Finsen not only by its lesser ampère but by having the water for cooling purposes placed at the proximal end of tube instead of the distal. Between the arc and the first lens there is placed a plate of quartz instead of a focal lens as in the Finsen apparatus. The space between these two forms a water cooling chamber, the function of which is to prevent undue heating of the first lens with the possibility of injury. This permits the uniting of the divergent rays into a more powerful sheaf of parallel rays nearer the patient, *i. e.*, at the front focal lens. In this way an arc of 20 ampères at 55 volts is almost equal to that of Finsen's (in the test) 70 ampères and 50 volts.

Price of apparatus complete. **\$225.00**

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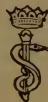
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Showing Method of Application of Dermo Lamp, G/7320/21.

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DERMO-ARC LAMP.

Dermo-Arc Lamp, designed by **Kjeldsen-Bang**, with Iron Electrodes.

This lamp (Fig. G/7320) consists of a hollow metal cylinder A, in the interior of which are placed iron electrodes together with suitable tubes for cooling them by means of a current of running water. In the cylinder is inserted a handle C through which pass the tubes for the electric current as well as those through which the current of water flows.

All the parts which carry the electric current are concealed in the interior of the instrument, and are so perfectly insulated that the one who is using it cannot possibly receive an electric shock.

The cylinder "a" can easily be detached from the handle "c". The light is produced and the apparatus placed in operation merely by pressure upon a button which is adjusted to the side of the handle.

The screw "e" regulates the Arc. The rays of light emerge through a short projection "f" in the side of the cylinder, which is closed by means of a convex lens of rock crystal. This plate may also serve as a pressure glass and is used in this way by FINSSEN apart from the apparatus which furnishes the light.

Inasmuch as overheating of the lamp can rarely if ever occur, there is no objection to the immediate application of the Rock Crystal lens to the portion of the body which is to receive treatment, thus permitting the rays of light to come in the closest proximity to the crystal. But aside from such use of the crystal the point is that it can be removed from the cylinder and the light rays turned directly upon the body.

Instruments in the form of a speculum or endoscope, may also be adjusted to the projection on the cylinder, and these can be introduced into the vagina, the rectum or the mouth, the deeper portions of the body being thus made amenable to treatment. There is also a second opening upon the cylinder which is used for the purpose of turning the rays of light, without using the Pressure Lens directly upon the body.

When this opening is not in use it is closed with a blue or red glass slide and then serves as an observation window for the arc light. The handle of this instrument permits one to use it with the greatest ease and convenience. If it is desired to have it secured and immovable, it can easily be attached by a clamp or other fastening to a table or chair.

The electrodes are so adjusted that the tubes for electricity and water are placed in two short canals which terminate in a shell or envelope on which the iron points are mounted.

When these points are used up, which happens after they have been used about twelve times they can be removed and other new ones substituted without any trouble.

A resistance is requisite for these lamps as well as for all arc lamps. The lamp requires a current strength of 5-10 amperes.

Careful attention must be given in all cases to the fact that when the lamp is in use water must be running through the electrodes. If this precaution should be neglected the electrodes would quickly be melted by the intense heat generated in them.

A portable stand will serve to hold a glass jar which acts as a reservoir for the water which flows through the iron electrodes of the lamp while it is in use.

The apparatus has been constructed with especial care to prevent the eyes from being dazzled by the intense glare of the light, but great caution should always be exercised lest the eyes be exposed to the direct influence of the light rays.

The mild cloud of steam which arises as the water is evaporated within the electrodes while they are in use can do no possible harm. It is of the same nature as that with which one constantly comes in contact in iron foundries.

The pressure crystal must be carefully rubbed so that it will be clean and dry every time it may be used.

The lamp can only be used in connection with direct current, preferably 110 volts, but can also be connected with a storage battery. Such a battery should have at least 24 cells. Such a storage battery in the absence of a direct current light circuit serves many useful purposes for apparatus for galvanism, faradism, endoscopy, electrolysis, cauterization, x ray induction coils, etc.

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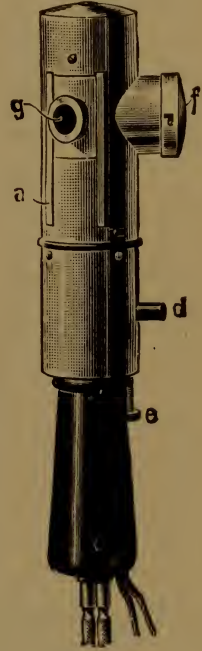
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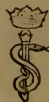
G/7320



G/7320

G/7320 Dermo Lamp , with single rock crystal compression lens without water Code SOLDA cooling space	\$60.00
G/7321 Dermo Lamp with double compression lens of rock crystal with water cir- Code SOUCI culation between for cooling purposes.....	75.00
G/7324 Iron Electrodes , per dozen pair..... Code SONNE	2.40
G/7326 Rheostat for regulating current..... Code SOPHO	15.00
G/7330 Constant Flow Water Circulation Stand , consisting of upright iron Code SOTTI stand and 2 irrigating bottles adjustable so as to have one bottle high and the other low, complete with rubber tubing, corks, etc. Price....	20.00

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G/7338

G/7338 Strebel's Iron Arc Lamp, for producing ultra violet rays.

Code SPAA

The apparatus is similar to G/7320/21. The handle is provided with 2 metal tubes for water inlet (tube of small diameter) and water outlet (tube of large diameter) which are to be connected with the water supply by a rubber hose. The Arc is started by pressing on one of the buttons on the side and may be regulated by a screw thread. The metal caps bearing these spring buttons may be slipped off for renewing the iron electrodes whenever they become useless.

The Pressure lens is made of rock crystal and the reflector is magnalium metal. As the iron electrodes are of the same size it is suggested to frequently change the polarity which is accomplished by a double throw switch on rheostat.

Price of Strebel's Lamp, complete.....	\$65.00
Suitable resistance for 110 or 220 volts, double throw switch and 1 doz. sets of extra Electrodes.....	35.00

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G/7340

G/7340 Compact Armamentarium for the treatment with ultra violet rays.

Code SPANI

This lamp is of somewhat different construction, from the ones previously described, consisting of two Iron Electrodes, with channels for water cooling and an accessory one of carbon. The latter is intended for starting the arc, and is placed in such a position, that it can be pushed between the iron electrodes to prime the lamp then being instantly released, after which manipulation the lamp will continue to operate until current is turned off.

A lens of best Rock Crystal is placed in front of Arc with which pressure may be made upon part or parts to be treated.

The complete apparatus is mounted on pedestal with oak table and drawer.

An Ampère-Meter, two fuse plugs and rack for holding lamp, are mounted on top of stands, while the current regulating rheostat is fastened to upright of pedestal.

Price.....\$ 1 25.0

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G/7347

G/7347 Sphaera Ultra-Violet Arc light with solid ball shaped iron electrodes.
Code SPAMO

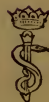
This apparatus is especially designed for sanatoria and institutions where treatment with ultra violet rays are extensively practised. It is particularly useful where large surfaces of or the entire human body are to be exposed to the action of the light.

The iron ball electrodes which are about 3 inches in diameter do not require water cooling and may be used for hundreds of hours. The iron will slightly oxidize on that part of the negative pole where the arc forms but the latter generally, will not exceed a surface larger than 1 or 2 square millimeters and the oxide can easily be brushed off.

The lamp may be used with direct current of from 65 to 220 Volts (alternating current does not enter into consideration). It requires 40 Volts with an ampereage not exceeding 25. Suitable resistance is required and can be furnished at additional price. When ordering please specify current at disposal.

Price for lamp complete, but without resistance..... \$125.00

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Electric Motors

Suitable for Direct and Alternating Currents

ESPECIALLY DESIGNED FOR

SURGICAL, DENTAL and MASSAGE PURPOSES,

MOTOR GENERATORS,

ROTARY CONVERTERS,

A. C. TRANSFORMERS

Note.—A complete descriptive catalogue is in course of preparation and will be sent upon application as soon as completed.

THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

Direct Current Stationary Motors.

These motors are of the enclosed type, scientifically constructed and thoroughly substantial in every way. Although small and compact they are mechanically correct. They are mounted on four small feet which may be removed without disfiguring the motor, should it be desired to suspend same from a bracket or crane, such as are described under Fig. G/4000 to 4012.

All of our motors are provided with self-aligning, bronze bearings with hard drawn bronze commutator, having a maximum number of segments in proportion to the size of the machine, and self-feeding brushes. Our $\frac{1}{8}$ HP motor is provided with wick feed oil cups, and the larger sizes with automatic self oiling bearings.

Owing to the thoroughly substantial manner in which these motors are constructed, they may be used for any service, intermittent or continuous, wherein the power required does not exceed the rating as set forth in the table below, and will stand a $33\frac{1}{3}\%$ overload for a reasonable length of time.

These motors are especially designed for massage and operative surgery, and are provided with a coupling fitting our standard flexible shaft or with pulleys if desired. They are constructed in four sizes as set forth in the following table:

Kny-Scheerer Co.'s Stationary Motors for Direct Current.



THE KNY-SCHEERER CO. N.Y.

G/3800/01

G/3800	$\frac{1}{8}$ HP 110-V approximate speed 1800 RPM	\$22.50
Code LABRA	Controller for same, Type R. 2.5.	5.00
G/3801	$\frac{1}{8}$ HP 220-V approximate speed 2000 RPM	25.00
Code LACHA	Controller for same, Type R. 2.5.	5.00

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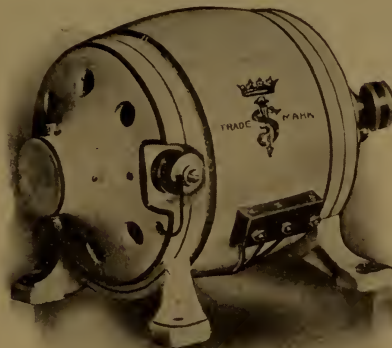
Kny-Scheerer Co.'s Stationary Motors for Direct Current.



THE KNY-SCHEERER CO. N.Y.

G/3806/7

G/3806	$\frac{1}{6}$ HP 110-V approximate speed 1800 RPM.....	\$30.00
Code LACRE	Controller for same, Type R. 11.5.....	7.50
G/3807	$\frac{1}{6}$ HP 220-V approximate speed 2000 RPM.....	33.00
Code LACTY	Controller for same, Type R. 2.75.....	7.50

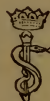


THE KNY-SCHEERER CO. N.Y.

G/3812/13

G/3812	$\frac{1}{4}$ HP 110-V approximate speed 2200 RPM.....	\$31.50
Code LADDY	Controller for same, Type TR 12.....	12.00
G/3813	$\frac{1}{4}$ HP 220-V approximate speed 2400 RPM.....	34.50
Code LAFAY	Controller for same, Type TR 21.....	12.00
G/3818	$\frac{1}{2}$ HP 110-V approximate speed 2400 RPM.....	55.00
Code LAFFI	Controller for same, Type TR 14.	15.00
G/3819	$\frac{1}{2}$ HP 220-V approximate speed 2400 RPM.....	61.00
Code LAGEA	Controller for same, Type TR 22.....	15.00

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Kny-Scheerer Co.'s Stationary Motors for Alternating Current.

Although slightly different in appearance they possess all of the qualities of our direct current machines, are handsomely finished and practically noiseless. *They are provided with a mechanical speed controller* giving variations from 100 to 3000 RPM and with a coupling fitting our standard flexible shaft or with pulleys if desired.



G/3850/3878

G/3850 50 cycles, 6000 Alternations 104/110-V, 1/20 HP approximate speed
Code LEDRU 1400 RPM.

Price, including mechanical speed controller..... **\$37.50**

G/3852 50 cycles, 6000 Alternations 112/120-V, 1/20 HP approximate speed
Code LEERE 1400 RPM.

Price, including Mechanical Speed Controller **37.50**

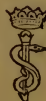
G/3854 60 cycles, 7200 Alternations 104/110-V, 1/20 HP approximate speed
Code LEGGE 1700 RPM.

Price, including Mechanical Speed Controller..... **37.50**

G/3856 60 cycles, 7200 Alternations 112/120-V, 1/20 HP approximate speed
Code LEGIO 1700 RPM.

Price, including Mechanical Speed Controller. **37.50**

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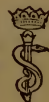
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Kny-Scheerer Co.'s Stationary Motors for Alternating Current.

G/3858 Code LEHDE	100 cycles, 12000 Alternations, 100/110-V, 1/20 HP approximate speed 2900 RPM.	Price, including Mechanical Speed Controller.....	\$42.50
G/3860 Code LEHRA	125 cycles, 15000 Alternations 100/110-V, 1/16 HP approximate speed 3600 RPM.	Price, including Mechanical Speed Controller.	37.50
G/3862 Code LEIBA	133 cycles, 16000 Alternations, 100/110-V, 1/16 HP approximate speed 3800 RPM.	Price, including Mechanical Speed Controller.....	37.50
G/3864 Code LEICE	40 cycles, 4800 Alternations, 104/115-V, 1/10 HP approximate speed 1100 RPM.	Price, including Mechanical Speed Controller.....	62.50
G/3866 Code LEKEI	60 Cycles, 7200 Alterations, 104/115-V, 1/10 HP approximate speed 1700 RPM.	Price, including Mechanical Speed Controller.....	54.00
G/3868 Code LEKTU	40 Cycles, 4800 Alterations, 104/115-V, 1/8 HP approximate speed 1100 RPM.	Price, including Mechanical Speed Controller.....	67.50
G/3870 Code LENDE	50 Cycles, 6000 Alternations, 104/115-V, 1/8 HP approximate speed 1400 RPM.	Price, including Mechanical Speed Controller	57.50
G/3872 Code LENNI	60 Cycles, 7200 Alternations, 104/115-V, 1/8 HP approximate speed 1100 RPM.	Price, including Mechanical Speed Controller.....	57 50
G/3874 Code LENTO	100 Cycles, 12000 Alternations, 100/110-V, 1/8 HP approximate speed 1850 RPM.	Price, including Mechanical Speed Controller.....	42.00
G/3876 Code LEONA	125 Cycles, 15000 Alternations 100/110-V, 1/8 HP approximate speed 1800 RPM.	Price, including Mechanical Speed Controller	57.50
G/3878 Code LEOP0	133 Cycles, 16000 Alternations, 100/110-V, 1/8 HP approximate speed 1850 RPM.	Price, including Mechanical Speed Controller.....	57.50

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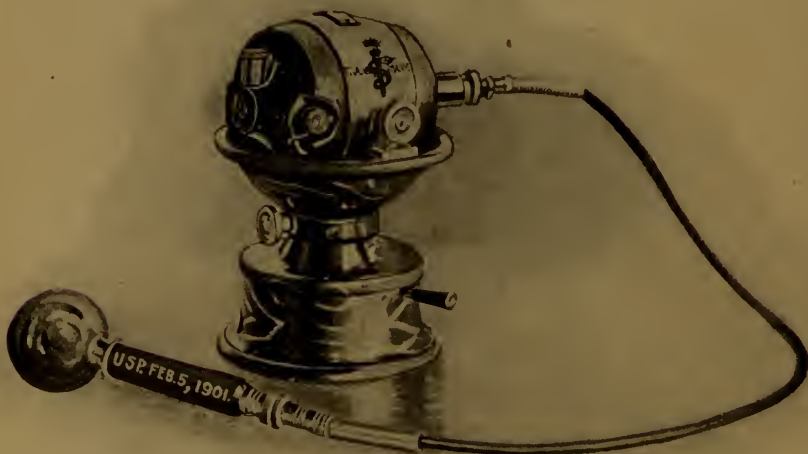
THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: EXRAY-NEW-YORK.

1-8 HP Swivel Desk Motors for Direct Current.

A convenient form of our $\frac{1}{8}$ HP motor of the enclosed type mounted upon a Universal Carriage, permitting angular elevation and circular movement upon center pivots at the same time. This is a very desirable pattern for operative surgery, as the motor may be swung into any position giving absolute freedom to the operator, and holding the motor rigid against vibration, it also may be locked in any given position if desired.

Swivel Desk Motors for Operative Surgery, Massage, Etc.



THE KNY-SCHEERER CO. N.Y.

G/3900/1

G/3900 $\frac{1}{8}$ HP 110-V approximate speed 1800 with controller in base, copper
Code LIVRE oxidized finish.

Price, for Motor and Rheostat not including flexible shaft and
Massage Apparatus G/3990 **\$37.50**

G/3901 $\frac{1}{8}$ HP 220-V approximate speed 1800 with controller in base, copper
Code LIWA oxidized finish.

Price, for Motor and Rheostat not including flexible shaft and
Massage Apparatus G/3990 **42 50**

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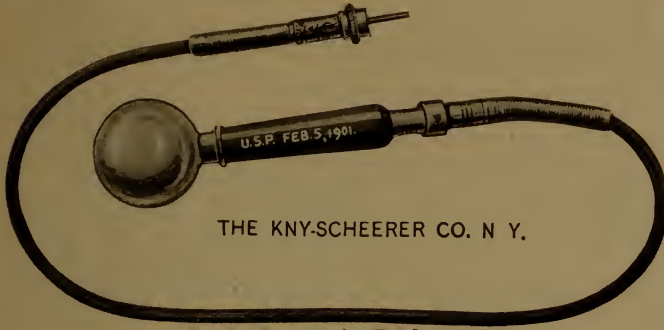


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G/3990

G/3990 Tremolo Massage

Code LOANO **Vibrator**, including flexible shaft and sleeve with couplings.

Price..... **\$30.00**

Set of six Localizing Vibratodes, Fig. A to F, see G/4025.. **5.00**

Crane-Motor—Outfits for Massage Purposes.



THE KNY-SCHEERER CO. N. Y.

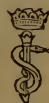
G/4000/1



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G/4002/03

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Crane-Motor—Outfits for Massage Purposes

For Direct or Alternating Currents.

These Motors are suspended from a telescopic crane of tripod design, handsomely black enameled and ornamented, and all steel parts heavily nickel plated.

The cranes are substantially constructed of solid metal, but are neat and artistic in appearance. Motors are suspended by means of a knuckle joint, permitting them to be swung into any position. Each Motor is fitted with a 36 in. flexible shaft and sleeve upon which is mounted our Patented Tremolo Massage Handle with regulable stroke attachment, Fig. G/3990.

For Direct Currents of 110 or 220 Volts.

G/4000 Motor Outfit, 1/8 HP, 110 volts complete with Controller and Tremolo Code LOBBE	G/3990, also 6 Vibratodes G/4025.....	\$80.00
G/4001 Motor Outfit, 1/8 HP, 220 volts complete with Controller and Tremolo Code LOCAO	G/3990, also 6 Vibratodes G/4025.....	85.00

G/4002 Motor Outfit, 1/6 HP, 110 volts complete with Controller and Tremolo Code LOCHA	G/3990, also 6 Vibratodes G/4025.....	87.50
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G/4003 Motor Outfit, 1/6 HP, 220 volts complete with Controller and Tremolo Code LODI	G/3990, also 6 Vibratodes G/4025.....	92.50
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For Alternating Current.

G/4010 Motor Outfit for 104 volts and 60 Code LOENY	Cycles complete with Mechanical Speed Controller and Tremolo G/3990, also 5 Vibratodes G/4025.....	90.00
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G/4011 Motor Outfit for 100/110 volts, 125 Code LOFTU	Cycles complete with Mechanical Speed Controller and Tremolo G/3990, also 6 Vibratodes G/4025.....	90.00
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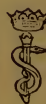
G/4012 Motor Outfit for 100/110 volts. 133 Code LOGRO	Cycles complete with Mechanical Speed Controller and Tremolo G/3990, also 6 Vibratodes G/4025.....	90.00
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Outfits with Alternating Current Motors of different voltages and frequencies from what is given above can be furnished. To arrive at their value take prices for A. C. Motors, Figs. G/3850 to G/3878, adding **\$50.00** for Crane and Massage Handle G/3990, also **\$5.00** for set of 6 Vibratodes.



G/4010/12

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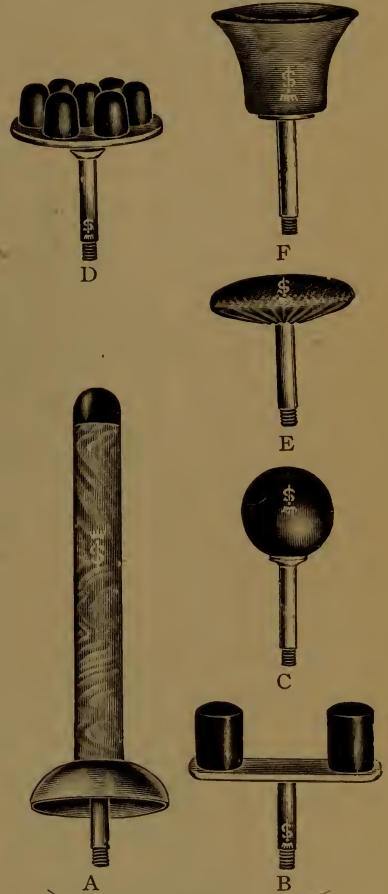
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Telegraphic Address: EXRAY-NEW-YORK.

Pedestal-Motor—Outfits for Massage Purposes.



G/4020



G/4025

G/4020 Motor Pedestals. These are made of cast iron base mounted upon rollers handsomely grained in imitation of oak. The upright cylinder is of seamless steel tubing. Top of quartered oak in swivel joint.

Any of the above outfits mounted upon our pedestal stand will cost additional to catalogue Figs. G/4400 to 4012.....

\$ 5.00

Code LORCA

Motor Pedestal, separate

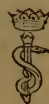
15.00

G/4025 Set of 6 Localizing Vibratodes, Figs. A to F. ...

5.00

Code LOTRO

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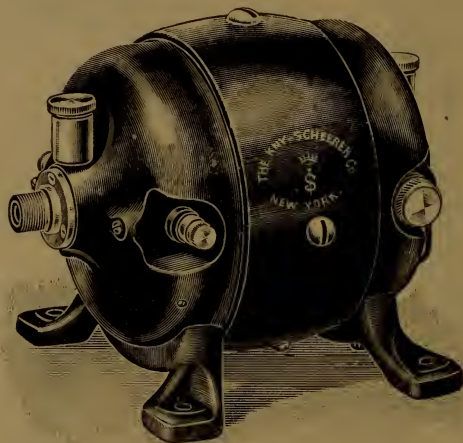
Telegraphic Address: EXRAY-NEW-YORK.

Motor Generators and Rotary Converters.

We make the following distinction between Motor Generators and Rotary Converters.

The **Motor Generators** have a primary and secondary winding on the armature, and from the secondary winding are obtained currents of various voltages and volumes as the case may require, either direct or alternating.

The **Rotary Converter** merely obliterates commutation of the current, delivering Alternating Current only, from a direct current line at practically the same voltage.



G/4100/4130

Motor Generators for Direct Current of 110 and 220 Volts.

G/4100	Motor Side, 110-V D. C. ; Generator Side, 3-V, 50 ampères A. C. Approximate speed, 2200 RPM. Complete with Controller.....	\$35.00
Code MAARE		
G/4102	Motor Side, 110-V D. C. ; Generator Side, 4-V, 70 ampères A. C. Approximate speed, 2200 RPM. Complete with Controller.....	40.00
Code MABLY		
G/4104	Motor Side, 220-V D. C. ; Generator Side, 3-V, 50 ampères A. C. Approximate speed, 2200 RPM. Complete with Controller.....	38.00
Code MACAO		
G/4106	Motor Side, 220-V D. C. ; Generator Side, 4-V, 70 ampères A. C. Approximate speed, 2200 RPM. Complete with Controller.	43.50
Code MACCA		

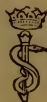
These machines may be used to directly heat Cauteary Electrodes or illuminate Diagnostic Lamps of small voltage, but not for both purposes at the same time.

Rotary Converters for Direct Currents of 110 and 220 Volts.

Rotary Convertors change direct current of a given voltage to alternating current of practically the same voltage, merely obliterating commutation of the current. The transformed current is single phase and sinusoidal in form. The frequency is governed by the speed at which the Converter is operated.

Our Converters are fitted with our standard flexible shaft coupling and may be used for operative surgery, massage, or power purposes as desired.

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THE KNY-SCHEERER COMPANY, NEW YORK.

Telegraphic Address: LXRAY-NEW-YORK.

Rotary Converters.

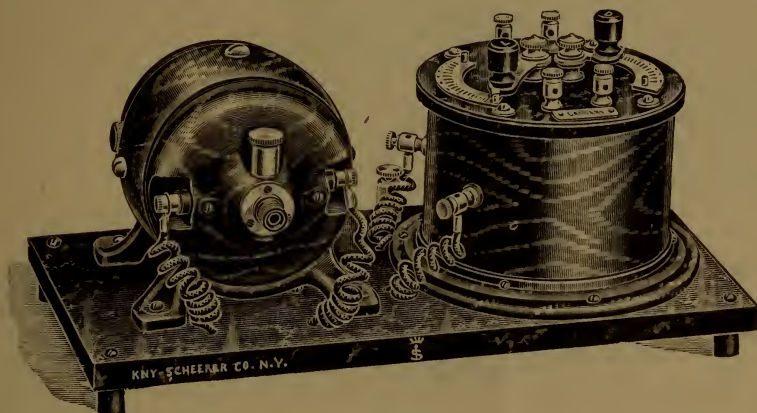
G/4120	$\frac{1}{8}$ HP 110-V.....	\$27.00
Code MACEO	Controller for same Type R 2.5.....	5.00
G/4122	$\frac{1}{8}$ HP 220-V.....	30.00
Code MACDO	Controller for same Type R 2.5.....	5.00
G/4124	$\frac{1}{6}$ HP 110-V.....	33.00
Code MACHI	Controller for same Type R 11.5.....	5 00
G/4126	$\frac{1}{6}$ HP 220-V.....	36 00
Code MACLU	Controller for same Type R 2.75.....	5.00
G/4128	$\frac{1}{4}$ HP 110-V.....	36 00
Code MACOY	Controller for same Type TR.....	12.00
G/4130	$\frac{1}{4}$ HP 220-V.....	39.00
Code MACTE	Controller for same Type TR. 21.....	12.00

Rotary Converter Outfits for Direct Current of 110 and 220 Volts.

Rotary Converter outfits are useful where it is desired to have both Cautery and Diagnostic Currents simultaneously, from a direct current line. For this service we recommend our combination converter and static transformer.

The motors of these outfits are fitted with our standard **flexible shaft coupling**, and therefore may also be used for operative surgery or massage if desired.

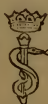
Outfit for the Simultaneous use of Cautery Electrodes and Diagnostic Lamps Upon Direct Current Circuits.



G/4180/86

G/4180	Outfit No. 1 consisting of $\frac{1}{8}$ HP 110-V Rotary Converter, Combination Static Transformer and Diagnostic Controller, Cautery Output up to 50 Ampères, Lamp Output up to 15-V, mounted on marbleized Slate Base.....	\$60.00
Code MARKE		

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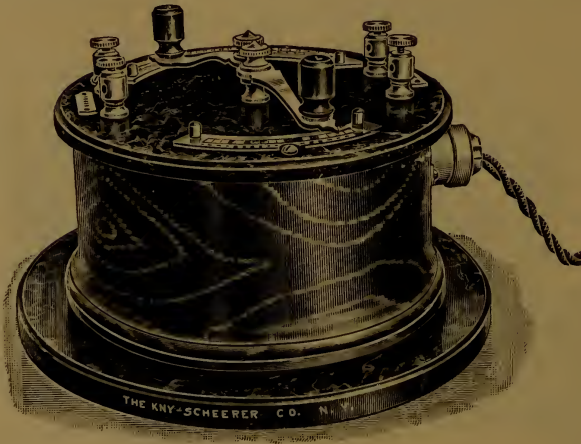
Telegraphic Address: EXRAY—NEW—YORK.

G/4182	Outfit No. 2, consisting of $\frac{1}{8}$ HP 220-V Rotary Converter, Combination Static Transformer and Diagnostic Controller, Cautery Output up to 50 Ampères Lamp Output up to 15-V mounted on marbled Slate Base.....	\$63.00
G/4184	Outfit No. 3, consisting of $\frac{1}{8}$ HP 110-V Rotary Converter, Combination Static Transformer and Diagnostic Controller, Cautery Output up to 70 Ampères, Lamp Output up to 15-V mounted on marbled Slate Base.....	66.00
G/4186	Outfit No. 4, consisting of $\frac{1}{8}$ HP 220-V Rotary Converter, Combination Static Transformer and Diagnostic Controller, Cautery Output up to 70 Ampères, Lamp Output up to 15-V mounted on marbled Slate Base	69.00

Alternating Current Transformers.

Where alternating current only is obtainable, our combination Static Transformer and Diagnostic Controller is very desirable. The apparatus is wound for both 52 and 104 Volt Circuit, having an output of 75 ampères. It is so arranged that the heat of any of the various Cautery Knives from the smallest to the largest may be perfectly regulated, as also the current for Diagnostic Lamps, requiring from 2 to 15 volts. It is of handsome copper, oxidized finish, and is provided with graduating scales, facilitating the pre-determination of the incandescence of either Knife or Lamp.

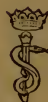
Kny-Scheerer Co.'s Standard A. C. Transformers.



G/4300/1

G/4300	For 104 Volt A. C. Circuit.....	\$25 00
Code MILBE		
G/4301	“ 52 “ “ “	25.00
Code MINEO		

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Alternating Current Cautery Transformers.



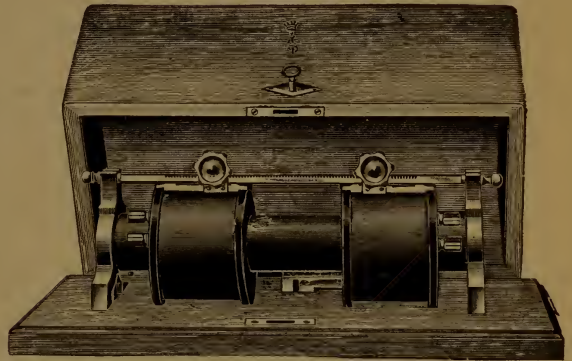
G/4310

G/4310 Transformer for smaller cautery knives with movable secondary spool to increase and decrease cautery current.

Price..... \$22.50

G/4311 Transformer, as above, with two movable spools, for cautery knives and diagnostic lamps.

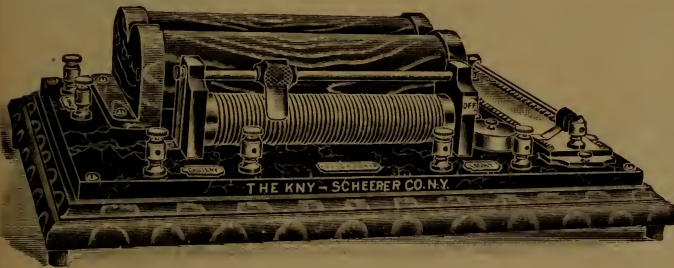
Price..... \$ 30.00



G/4311

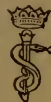
G/4312 Table Plate, for heavy cautery and diagnostic lamp currents.

Price..... \$ 40.00



G/4312

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TELEGRAPHIC CODE.

When making use of this “**Cipher Code**” please observe the following rules:

The telegraphic address registered with the various Cable Companies in New York is
“EXRAY—NEW—YORK.”

Use this address only and your message of code words will be readily understood. We desire to remark that the telegraphic address *EXRAY* is to be used only for messages intended for our *Electrical Department* in connection with the code words given in this catalogue.

Other departments of our business have different telegraphic addresses and different code words.

To specify the quantity or number of pieces, weight, square foot, etc., prefix to the code word quoted under the respective catalogue number a word consisting of three letters.

Gab 1 piece	Gha 4 dozen	Gis 5 pounds	Gyl 30 sq. inches
Gad 2 pieces	Gia 6 “	Git 6 “	Gym 40 “
Gae 3 “	Gla 8 “	Gin 8 “	Gyp 50 “
Gaf 4 “	Gma 10 “	Giz 10 “	Gyr 80 “
Gai 5 “	Goa 12 “	Ghi 12 “	Gys 100 “
Gak 6 “	Gra 1 ounce	Gli 15 “	Gyt 1 sq. foot
Gal 7 “	Gya 2 ounces	Gmi 20 “	Gyz 2 “
Gam 8 “	Gib 4 “	Goi 25 “	Ghy 3 “
Gap 9 “	Gie 6 “	Gri 35 “	Gly 4 “
Gar 10 “	Gif 8 “	Gyi 50 “	Gmy 5 “
Gas 1 dozen	Gik 12 “	Gyb 1 sq. inch	Goy 6 “
Gat 1 $\frac{1}{4}$ “	Gil 1 pound	Gyd 2 sq. inches	Gry 8 “
Gau 1 $\frac{1}{2}$ “	Gim 2 pounds	Gye 5 “	Gsy 10 “
Gay 2 “	Gip 3 “	Gyf 10 “	
Gaz 3 “	Gir 4 “	Gyk 20 “	

Examples.

Gadnino=**Gad**=2 pieces; **Nino**=**G/5348 X**= Ray tubes.

Gylplane=**Gyl**=30 square inches; **Plane**=**G/6454** protective head-foil.

Following we give some code abbreviations which may be useful in the majority of cases where it is desirable to place orders by telegraph.

Gadsden	—	The source of electric current available in the following:
Gaines	—	Direct Current 110 volts E. M. F.
Gallagher	—	“ 220 “ “
Gallatin	—	“ 500 “ “
Gallaudet	—	Alternating Current 50 cycles, 6000 alternations, 104/110 Volts E. M. F.
Gambier	—	“ 50 “ 6000 “ 112/120 “ “
Gansevoort	—	“ 60 “ 7200 “ 104/110 “ “
Garfield	—	“ 60 “ 7200 “ 112/120 “ “
Garrick	—	“ 100 “ 12000 “ 100/110 “ “
Gascoygne	—	“ 125 “ 15000 “ 100/110 “ “
Gaskell	—	“ 133 “ 16000 “ 100/110 “ “
Gataker	—	“ 40 “ 4800 “ 104/115 “ “
Gatling	—	Have no electric current at our disposal must rely upon Storage Batteries.
Gaveston	—	“ “ “ “ “ “ “ “ “ Benzine Motors.
Gawden	—	“ “ “ “ “ “ “ “ “ Gas Motor Engine.

Questions

Geary	Quote Net Price f. o. b. New York for the following apparatus.
Geddes	Quote Net Price f. o. b. English or European continental port for the following.
Genghis	How quick can shipment be made in case our order is placed.
Genseric	At what rate of freight per hundred pound can you ship
Geoffroy	Answer is expected promptly by telegraph.
George	Answer is expected promptly by return mail.
Gerard	Mail full information and lowest prices for the following.
Gerry	Reply by telegraph when goods ordered will be shipped.

Orders.

Gibbons	Accept your proposal for furnishing us with the apparatus quoted, make prompt shipment.
Giddings	Accept your proposal, prepare goods for shipment, but await shipping instructions forwarded by this mail.
Gifford	Terms and prices of goods are satisfactory, fill order at once.
Gilbert	Delivery must be made within.....days.
Gilchrist	Desire latest improvements incorporated on the apparatus ordered.
Gillespie	Delivery cannot be made before.....days.

Terms of Payment.

Gillmore	Ship goods, make sight drafts with bill and shipping papers attached.
Gillott	Draw upon me (us) for amount of invoice in any way most convenient.
Gillray	Remittance for amount of order will be sent by this mail.
Gilpin	New York references have been sent by this mail.

Shipping Instructions.

Gladstone	Ship by freight usual way.
Gliddon	" " fast freight.
Goddard	" " steamer.
Godfrey	" " express.
Gordon	" " by quickest way possible regardless expense.

Cable Codes.

Gorton	When telegraphing use A B C Code.
Gosnold	" " " A 1 Code.
Gowrie	" " " Western Union Code.
Graham	" " " Lieber Code.

EXAMPLE.

A cable dispatch compiled from our cipher code for this catalogue worded as follows :

EXRAY—NEW—YORK.

GEARY—GABPASTY—GADSDEN—GAINES—GENGHIS—GEOFFROY

will read translated:

SIGNATURE.

To The Kny-Scheerer Co., Electrical Dept., New York. Quote Net Price f. o. b. New York for G/6112 Perfection Type X-Ray Outfit No. 10 without high frequency attachment, the source of electric current at our disposal is Direct Current of 110 volt electro-motive force. How quick can shipment be made in case our order is placed. Answer is expected promptly by Telegraph.

SIGNATURE.

Now Ready

"Nothing of true value seems to be omitted, and each subject is treated with a clearness which is as refreshing to a practitioner as it must be to a student."

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IN
X-RAY METHODS AND MEDICAL USES
OF LIGHT, HOT-AIR, VIBRATION
AND HIGH-FREQUENCY
CURRENTS

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DISEASES, AND SANITARIUM PRACTICE

BY

S. H. MONELL, M.D.

NEW YORK

Professor of Static Electricity in the International Correspondence Schools; Founder and Chief Instructor of the New York School of Special Electro-Therapeutics; Member of the New York County Medical Society; Member of Kings County Medical Society; Charter Member of the Roentgen Society of the United States; Formerly Editor of the Electro-Therapeutic Department of the Medical Times and Register, 1894-8; Author of "The Treatment of Disease by Electric Currents," "Manual of Static Electricity in X-Ray and Therapeutic Uses," "Elements of Correct Technique," "Rudiments of Modern Medical Electricity," etc., etc.

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THE great adjuncts to the materia medica and surgery which are considered in this Pictorial System of Instruction include modern scientific X-Ray Diagnosis, X-Ray Therapeutics, the revolutionary development of Electric Light Therapy, the efficient therapeutics of superheated dry Air with improved Hot-air Apparatus, the important Therapeutics of Vibration-apparatus for mechanical Massage, and the practical but yet unfamiliar therapeutics of High-Frequency attachments for X-Ray Coils.

These resources of special treatment take the physician into a new realm of therapeutics, a new world of clients, improved results, and the secondary financial benefits of enhanced reputation, for in the long run "good medicine is good business." Scientific therapeutic apparatus unlocks the door to many of the problems of the practitioner, and releases him from many of the anxieties of professional life, for whatever will benefit his patients will eventually benefit the doctor.

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This System of Instruction is therefore designed for all physicians and surgeons who treat patients in their office, and for sanitariums. It covers the broadest field of practice, both general and special. It will touch at some point the interests of every practitioner in the land. Much of its teachings will possess striking novelty for those whom it is intended to benefit. Its revelations of practical resources may well astonish, but must inevitably attract the majority of students, for not one in a hundred has yet investigated the facts set forth.

The Specialist demonstrates that a prime foundation of a prosperous office practice is *Apparatus*, and the family physician may wisely take a leaf from the same book: but what apparatus to get, and how to make it pay, is not so readily settled off-hand. These clinics have been prepared to solve the problem.

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contain full directions for the X-ray treatment of superficial cancers, lupus, rodent ulcer, hypertrichosis, parasitic and other skin diseases, this method now exciting world-wide interest in the medical profession. The section on X-ray Therapy is alone worth many times the cost of the book.

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will purchase this great work some time, without doubt, for it is a necessity in every surgical and medical office. Do not wait, but order now and begin at once to profit by the instruction. The six branches of clinical teachings cost but the small sum of \$2.50 each.

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“A Book

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